

Aktuelle wissenschaftliche Beiträge zum Doping

Eine kommentierte Auswahlbibliografie für den Zeitraum 1997 - 1999

Current Scientific Publications on Doping

An Annotated Selected Bibliography Covering the Period from 1997 - 1999

Köln im Juni 1999 / Cologne, June 1999

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Vorwort

Das Bundesinstitut für Sportwissenschaft zählt zu seinen vorrangigen Aufgaben, den Sport bei seinen Anstrengungen in der Dopingbekämpfung zu unterstützen. Diese Unterstützung erfolgt durch materielle Förderung der beiden deutschen Dopingkontrolllabore in Köln und in Kreischa, durch die Initiierung und Finanzierung von Forschungsprojekten sowie durch die Auswertung von einschlägigen Untersuchungen und Berichten zur Dopingbekämpfung.

Die vorliegende Bibliographie wissenschaftlicher Literatur zum Doping ist die erste vom Bundesinstitut vorgelegte Bibliographie zu diesem Thema. Es ist zu wünschen, daß sie in den Kreisen des Leistungssports weite Verbreitung findet und zur vertieften Auseinandersetzung mit diesem hochaktuellen Thema beiträgt.

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Impressum

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Preface

An important task of the Federal Institute of Sport Science involves supporting sport federations in their fight against doping. This support takes place through material support of the two doping control laboratories in Cologne and Kreischa, the initiation and financing of research projects as well as through the evaluation of special studies and papers dealing with the fight against doping.

It is hoped that this bibliography will find widespread readership in the area of competitive sport and stimulate in-depth study of this highly topical subject.

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Einleitung

Die folgende Doping-Bibliographie ist ein Auszug aus den in der Literaturdatenbank SPOLIT des Bundesinstituts für Sportwissenschaft (BISp) und der Datenbank des Sport Research and Information Centres (SIRC) in Ottawa/Kanada enthaltenen Daten. Die Suche wurde auf diese beiden Datenbanken beschränkt, um Dokumente aufzunehmen, die (in der Mehrheit) einen eindeutigen Sportbezug aufweisen. Leser, die an rein medizinischen, chemischen und pharmazeutischen Fragestellungen interessiert sind, seien an die einschlägigen Datenbanken (z.B. MEDLINE) verwiesen. In der Bibliographie wird deutlich, daß die Datenbank SPOLIT des BISp zu jeder Literaturangabe ein Abstract enthält, das dem Nutzer die Literatursuche erleichtert. Zusätzlich wurden alle deutschsprachigen Abstracts ins Englische übersetzt, um die internationale Rezeption dieser Bibliographie zu erleichtern.

SPOLIT ist auf der CD ROM "Sportwissenschaft" enthalten, die unter folgender Adresse bezogen werden kann: Edition Czwalina im Feldhaus Verlag, Postfach 730240, 22122 Hamburg. Anfragen zu Recherchemöglichkeiten können an die im Impressum angegebene Adresse gerichtet werden.

Diese Bibliographie enthält insgesamt 204 Dokumente aus den Jahren 1997 bis zur Gegenwart. Sie ist in sieben Kapitel unterteilt:

1. Beiträge zu den Auswirkungen, zur Epidemiologie sowie zu den Wirkungen und Nebenwirkungen verschiedener Dopingsubstanzen (83 Dokumente)
2. Publikationen zur Dopingkontrolle (59 Dokumente)
3. Artikel zu geschichtlichen und sozialpolitischen Aspekten des Dopings im Sport (11 Dokumente)
4. Publikationen zu rechtlichen Problemen des Dopings (20 Dokumente)
5. Beiträge zum Doping bei Jugendlichen (7 Dokumente)
6. Artikel zu ethischen Aspekten des Dopings im Sport (8 Dokumente)
7. Publikationen zu allgemeinen oder übergreifenden Aspekten des Dopings im Sport (16 Dokumente).

Dies ist lediglich eine grobe Unterteilung, denn es gibt fließende Übergänge insbesondere zwischen Kapitel 1 und 2.

Die leistungsfördernden Substanzen, die ausdrücklich in den in Kapitel 1 aufgeführten Publikationen behandelt werden, sind die folgenden:

- **Anabol-androgene Steroide** (DI/YANG, EVANS, FALKENBERG et al., FARAJ, FERRERA, FUERST, GOTZMANN, MARECK-ENGELKE, GRUCZA et al., HONOUR, KETCHUM, KORKIA, KORKIA/STIMSON, MONDENARD, NO AUTHOR, RAYNAUD et al., RICH et al., SCHWARZ, STURMI/DIORIO, WROBLEWSKA, WU, YESALIS; **Insulin**: DAWSON/HARRISON, ELKIN et al., WILLEY)
- **Stimulantien** (**Ephedrin**: BLEDSOE, SMITH, SWAIN et al.; **Koffein**: KOVACS et al.; **Koka**: SPIELVOGEL et al.; **Nikotin**: MONDENARD, SCHWEIZER et al.)
- **Narkotika** (Dextropropoxyphen: SCHÄNZER et al.)
- **Peptidhormone** (**Erythropoietin**: AUDRAN et al., BRESSOLLE et al., CLASING, ECKARDT, LAVOIE et al., MURPHY, NO AUTHOR, PETERS/FANDREY, PFITZINGER, RENDIC, ROBERTS, ROSSI ET AL., SCHAMASCH, WANG, YANG et al.; **Wachstumshormon**: HEALY/RUSSELL-JONES, LAURA)
- **Beta-2-Agonisten** (LARSSON et al.; **Salmeterol**: MCDOWELL et al.)
- **Synthetische Glukokortikoide** (**Dexamethason**: LAFARGE et al.)
- **Psychopharmaka im allgemeinen** (Schwenk)
- **Nahrungsergänzungsstoffe** (Allgemein: BAUM, KREIDER; **Kreatin**: BRÖNNIMANN, MOEN, FERREIRA, HECK/SCHULZ, WILLIAMS et al.; **Pflanzliche Energiespender**: JENKINS)
- **Maskierungssubstanzen** (**Bromantan**: SIZOI et al., UEKI et al.)
- **Blutdoping** (PANDOLF et al.)
- **Gendoping** (SCHULZ et al.).

Bei den Publikationen von CLARKSON/THOMPSON, EICHNER, KNOPP et al., SCHÄNZER, STRICKER, und WILLIAMS handelt es sich um allgemeine Übersichtsartikel zu leistungsfördernden Substanzen und Maßnahmen im Sport.

Die in Kapitel 2 aufgelisteten Artikel zur Dopingkontrolle behandeln u.a. den Nachweis folgender Wirkstoffe:

- **Anabole Steroide** (AYOTTE, BOER et al., BRISSON et al., CATLIN/HATTON, CHROSTOWSKI/GRUCZA, GEYER et al., GRÄF/SCHIENER, HORNING et al., MAREK-ENGELKE et al., MUNOZ-GUERRA et al.,

- NOLTEERNSTING/SCHÄNZER, NUTTER/RAUHE, PASCUAL et al., PERRY et al., SACHTLEBEN et al., SCHÄNZER et al., SHACKLETON et al., THIEME et al., UEKI et al.)
- **Stimulantien (3.4-Methylendioxyamphetamin:** BOER et al.; **Benzphetamin/Clobenzorex:** TSOUSOLOVA-DRAGANOVA et al.; **Koffein:** ROSSI et al., SCHÄNZER/GOTZMANN)
 - **Narkotika** (YOUXUAN et al.)
 - **Peptidhormone** (HCG: DELBEKE et al., STENMAN et al., WANG; **Erythropoietin:** BREIDBACH/SCHÄNZER, BRESSOLLE et al., FERSTLE, MANTELL; **Wachstumshormon:** HEALY/RUSSELL-JONES, KICMAN et al., LAURA, ZENG et al.)
 - **Beta-2-Agonisten (Clenbuterol:** GLEIXNER et al., SAUERWEIN et al.)
 - **Synthetische Kortikosteroide** (POPOT et al.)
 - **Diuretika** (LALLJIE et al.)
 - **Analgetika** (YOUXUAN et al.).

Die folgenden Kontrollmethoden werden thematisiert:

- **Bluttests** (BIRKELAND et al., CHROSTOWSKI/GRUCZA, FERSTLE)
- **Haaranalyse** (BOER et al., GLEIXNER et al., GRÄF/SCHIENER, SAUERWEIN et al., SCHÄNZER)
- **DNA-Typisierung** (GEYER et al.)
- **Chromatographische/spektrometrische Methoden (Kohlenstoff-Isotopen-Massenspektrometrie:** HORNING et al.; **Gaschromatographie/Hochauflösende Massenspektrometrie:** HORNING et al., NOLTEERNSTING/SCHÄNZER, SCHÄNZER, SCHÄNZER et al., SHACKLETON et al., THIEME et al.; **Ionenfallen-Massenspektrometrie:** MUNOZ-GUERRA et al., PASCUAL et al.; **Mizellare elektrokinetische Chromatographie:** LALLJIE et al.; **Hochleistungsflüssigkeitschromatographie:** ROSSI et al.)
- **Chemilumineszenz-Immunoassay** (BREIDBACH/SCHÄNZER)
- **Hydrolyse** (GEYER et al., YOUXUAN et al.).

Die meisten der in Kapitel 3 präsentierten Zeitschriftenaufsätze und Bücher behandeln das Dopingssystem in der ehemaligen DDR (FRANKE/BERENDONK, HÖFER, MÜLLER/GROSSE, SPITZER, VANDEWEGHE).

Während der Artikel von APPLGATE/GRIVETTI rein historiographischer Natur ist, stellt DIGEL eine Beziehung zwischen der Vergangenheit und Gegenwart her, insofern er argumentiert, daß Dopingvergehen aus der Vergangenheit aus heutiger Sicht nur objektiv beurteilt werden können, wenn berücksichtigt wird, wann das Dopingproblem von dem betroffenen internationalen Verband erstmalig erkannt wurde, wann die ersten Dopingbestimmungen in die Satzung des betreffenden Verbandes aufgenommen wurden und zu welchem Zeitpunkt mit Wettkampfkontrollen und mit unangekündigten Trainingskontrollen in dem betreffenden Verband begonnen wurde.

DENHAM liefert einen historischen Überblick, wie Sports Illustrated, eine amerikanische Zeitschrift mit einer durchschnittlichen Auflagenhöhe von fünf Millionen, über den Einsatz von Steroiden in der Leichtathletik in den achtziger Jahren berichtete. Die Untersuchung widmet sich in diesem Zusammenhang der Thematisierungsfunktion als Theorie der Massenmedien, derzufolge Sachthemen (in diesem Fall Doping) erst dann zum Gegenstand öffentlicher Debatten und politischer Diskussion werden, nachdem sie in den Massenmedien behandelt wurden.

JACKSON untersucht am Beispiel des Dopingfalls Ben Johnson die Ausbildung nationaler Identität.

Die öffentliche Wahrnehmung des Dopings in der Schweiz ist das Thema des Beitrags von NOCELLI et al. Die Autoren gelangen zu der Schlußfolgerung, daß nur wenige Eltern ihre Kinder aufgrund des Dopingrisikos vom Sport fernhalten würden.

Eine interessante Sichtweise des Dopingproblems vertritt BEUKER. Er behauptet, daß Doping im Sinne der allgemein geübten Leistungsstimulation aus gesellschaftlicher Sicht nicht verboten ist. Im Sport ist Doping jedoch aufgrund des Fairness-Gebots untersagt. Dabei ist seiner Meinung nach der chemische Eingriff in die Dimensionen natürlicher Fähigkeiten nichts anderes als die Modulation der Leistung durch Training, das in seinen verschiedenen Formen auch nur die differenzierten Möglichkeiten des Körpers entwickelt und anregt. Nicht jeder ist in der Lage, so extensiv oder gut zu trainieren wie der andere. Auch hierin ist eigentlich eine Verletzung der Fairness zu sehen, da die Bedingungen ungleich sind und die unterschiedlichen Voraussetzungen unterschiedlich entwickelt werden. Im Falle des Dopings wird der Sportler zum wesentlichen Schuldträger abgestempelt, während die Gesellschaft, die im Grunde die Basis für die Handlungsweise bzw. die entsprechenden Bestimmungen bietet, überhaupt nicht bestraft wird; sie nimmt noch nicht einmal ihre Mitschuld zur Kenntnis. Angesichts dieser Widersprüchlichkeit fordert BEUKER u.a. eine Aufklärungsaktion im gesamtgesellschaftlichen Umfeld, die nicht nur die Wirkung der einzelnen schädlichen und verbotenen Substanzen definiert, sondern vor allem die prinzipielle Einstellung zu Stimulationsmitteln generell in Frage stellt und reguliert.

Die in Kapitel 4 aufgeführten Veröffentlichungen behandeln juristische Aspekte des Dopings aus dem Blickwinkel des

- **Strafrechts** (FRITZWEILER, HAAS/PROKOP, HEIKKALA, MESTWERDT, SCHLUND)
- **Haftungsrechts** (IRA-FINGERHOOD et al., OLG DRESDEN, TARASTI)
- **Arbeitsrechts** (CAJSEL).

Der Rechtsschutz von Sportlern, denen Doping vorgeworfen wird, wird von ANDERSEN/AUBERG diskutiert. Leser, die sich für rechtliche Aspekte des Dopings im Ausland interessieren, sollten einen Blick in die Beiträge von CAJSEL, KROGMANN, RÖTHEL und VIEWEG werfen.

Drei der insgesamt sieben in Kapitel 5 aufgeführten Artikel behandeln ausdrücklich den Drogenkonsum von Schülern (DURANT et al., NUTTER, WALTER). Die meisten Beiträge in diesem Kapitel behandeln die Verwendung anabol-androgener Steroide (ANDERSON et al., DURANT et al., FRANCHINI et al., NUTTER, YESALIS et al.).

Die Mehrheit der in Kapitel 6 vorgestellten Artikel behandeln ethische Aspekte des Dopings aus allgemeiner Sicht. Interessant ist die Argumentationsweise von Angela SCHNEIDER, die behauptet, daß unangekündigte Trainingskontrollen eine Verletzung der Persönlichkeitsrechte der Sportler darstellen. Die Autorin hält einen derartigen Verstoß gegen die Persönlichkeitsrechte nicht für vertretbar und plädiert dafür, daß Trainingskontrollen von den Sportlern selbst, Wettkampfkontrollen hingegen weiterhin von den Verbänden durchzuführen seien.

Die im letzten Kapitel dieser Bibliographie vorgestellten Publikationen behandeln unterschiedliche und allgemeine Aspekte des Dopings im Sport. Insbesondere die

folgenden Themen verdienen Beachtung:

- **Die Marktperspektive des Dopings** (BLACK/PAPE)
- **Die Ausbildung der Trainer im Hinblick auf das Dopingproblem und ihre Einschätzung des Dopingproblems** (DEN-DUYN, ELLIOT et al.)
- **Das Wissen der Ärzte über verbotene Substanzen im Sport** (GREENWAY/GREENWAY)
- **Doping und Entwicklungsländer** (KIDANE)
- **Ursachenanalyse des Dopings** (MERODE, PAI).
- **Von Studentensportlern bevorzugte Dopingsubstanzen** (PAN/BAKER).

Das von KURZ/MESTER als Dokumentation eines Symposiums zu Ehren von Professor Manfred Donike herausgegebene Buch behandelt eine große Vielfalt von Dopingaspekten und kann daher denjenigen empfohlen werden, die an einem Gesamtüberblick interessiert sind.

Diese Bibliographie erhebt nicht den Anspruch auf Vollständigkeit, sondern stellt lediglich eine Auswahl von Publikationen vor, die dem Leser einen groben Überblick über unterschiedliche von 1997 bis zur Gegenwart diskutierte Aspekte des Dopings geben.

Introduction

The following bibliography about doping is an extract from the data contained in the literature database SPOLIT of the Federal Institute of Sport Science (BISp) and the database of the Sport Research and Information Centre (SIRC) in Ottawa/Canada. The search was restricted to these databases to guarantee the inclusion of documents (most of) which clearly relate to sport. Readers who are interested in purely medical, chemical, and pharmaceutical aspects should additionally consult corresponding specific databases (e.g. MEDLINE). Unlike the SIRC database, SPOLIT contains abstracts of every document, which help users in the process of selecting the literature needed. Additionally all German abstracts have been translated into English to facilitate the international reception of this bibliography. SPOLIT is available on the CD ROM "Sportwissenschaft" ("Sport Science"), which can be ordered from the following address: Edition Czwilina im Feldhaus Verlag, Postfach 730240, 22122 Hamburg, Germany. Requests for literature searches can be sent to the address given in the imprint of this bibliography (p. 5 or 7).

This bibliography includes altogether 204 documents from the years 1997 until the present. It is subdivided into seven chapters:

1. Publications about the epidemiology as well as the effects and side effects of various doping substances (83 documents)
2. Publications dealing with doping control (59 documents)
3. Articles focussing on historical and sociopolitical aspects of doping in sport (11 documents)
4. Publications dealing with legal problems of doping in sport (20 documents)
5. Articles about doping with young athletes (7 documents)
6. Articles dealing with ethical aspects of doping in sport (8 documents)
7. Publications dealing with general aspects of doping in sport (16 documents).

This is only a rough division because there are fluent transitions between some chapters (particularly between chapters 1 and 2).

The ergogenic substances explicitly dealt with in the publications listed in chapter 1 are the following:

- **Anabolic-androgenic steroids** (DI/YANG, EVANS, FALKENBERG et al., FARAJ, FERRERA, FUERST, GOTZMANN, MARECK-ENGELKE, GRUCZA et al., HONOUR, KETCHUM, KORKIA, KORKIA/STIMSON, MONDENARD, NO AUTHOR, RAYNAUD et al., RICH et al., SCHWARZ, STURMI/DIORIO, WROBLEWSKA, WU, YESALIS; **Insulin**: DAWSON/HARRISON, ELKIN et al., WILLEY)
- **Stimulants** (Ephedrine: BLEDSOE, SMITH, SWAIN et al.; Caffeine: KOVACS et al.; Coca: SPIELVOGEL et al.; Nicotine: MONDENARD, SCHWEIZER et al.)
- **Narcotics (Dextropropoxyphene**: SCHÄNZER et al.)
- **Peptide hormones (Erythropoietin**: AUDRAN et al., BRESSOLLE et al., CLASING, ECKARDT, LAVOIE et al., MURPHY, NO AUTHOR, PETERS/FANDREY, PFITZINGER, RENDIC, ROBERTS, ROSSI ET AL., SCHAMASCH, WANG, YANG et al.; **Growth Hormone**: HEALY/RUSSELL-JONES, LAURA)
- **Beta-2 agonists** (LARSSON et al.; **Salmeterol**: MCDOWELL et al.)
- **Synthetic glucocorticoids (Dexamethasone**: LAFARGE et al.)
- **Psychoactive drugs in general** (Schwenk)
- **Nutritional supplements** (General: BAUM, KREIDER; **Creatine**: BRÖNNIMANN, MOEN, FERREIRA, HECK/SCHULZ, WILLIAMS et al.; **Herbal energizers**: JENKINS)
- **Masking agents (Bromantane**: SIZOI et al., UEKI et al.)
- **Blood doping** (PANDOLF et al.)
- **Gene doping** (SCHULZ et al.).

The articles by CLARKSON/THOMPSON, EICHNER, KNOPP et al., SCHÄNZER, STRICKER, and WILLIAMS are general overviews of ergogenics substances and measures used in sport.

The articles about doping control included in chapter 2 deal for example with the detection of the following doping agents:

- **Anabolic steroids** (AYOTTE, BOER et al., BRISSON et al., CATLIN/HATTON, CHROSTOWSKI/GRUCZA, GEYER et al., GRÄF/SCHIENER, HORNING et al., MAREK-ENGELKE et al., MUNOZ-GUERRA et al., NOLTEERNSTING/SCHÄNZER, NUTTER/RAUHE, PASCUAL et al., PERRY et al., SACHTLEBEN et al., SCHÄNZER et al., SHACKLETON et al., THIEME et al., UEKI et al.)
- **Stimulants (3.4-methylenedioxymethamphetamine**: BOER et al.; **Benzphetamine/Clobenzorex**: TSOUTSOULOVA-DRAGANOVA et al.; **Caffeine**: ROSSI et al., SCHÄNZER/GOTZMANN)
- **Narcotics** (YOUXUAN et al.)
- **Peptide hormones** (HCG: DELBEKE et al., STENMAN et al., WANG; **Erythropoietin**: BREIDBACH/SCHÄNZER, BRESSOLLE et al., FERSTLE, MANTELL; **Growth Hormone**: HEALY/RUSSELL-JONES, KICMAN et al., LAURA, ZENG et al.)
- **Beta-2 agonists (Clenbuterol**: GLEIXNER et al., SAUERWEIN et al.)
- **Synthetic corticosteroids** (POPOT et al.)
- **Diuretics** (LALLJIE et al.)
- **Analgetics** (YOUXUAN et al.).

Some of the doping control methods dealt with are:

- **Blood testing** (BIRKELAND et al., CHROSTOWSKI/GRUCZA, FERSTLE)
- **Hair analysis** (BOER et al., GLEIXNER et al., GRÄF/SCHIENER, SAUERWEIN et al., SCHÄNZER)
- **DNA typing** (GEYER et al.)
- **Chromatographic/spectrometric methods (Carbon Isotope Ratio Mass Spectrometry:** HORNING et al.; **Gas Chromatography/High Resolution Mass Spectrometry:** HORNING et al., NOLTEERNSTING/SCHÄNZER, SCHÄNZER, SCHÄNZER et al., SHACKLETON et al., THIEME et al.; **Ion Trap Mass Spectrometry:** MUNOZ-GUERRA et al., PASCUAL et al.; **Micellar Electrokinetic Chromatography:** LALLJIE et al.; **High Performance Liquid Chromatography:** ROSSI et al.)
- **Chemiluminescence immunoassay** (BREIDBACH/SCHÄNZER)
- **Hydrolysis** (GEYER et al., YOUXUAN et al.).

Most of the articles and books listed in chapter 3 deal with the doping system in the former GDR (FRANKE/BERENDONK, HÖFER, MÜLLER/GROSSE, SPITZER, VANDEWEGHE). While the article by APPLGATE/GRIVETTI is of purely historiographic nature, the paper by DIGEL establishes a relationship between the past and present insofar as the author argues that from the point of view of today doping violations of the past can only be judged objectively when it is considered at what time the doping problem was identified as a problem in the respective international sport federation, at what time the first doping regulations were included in the statutes of this federation, at what time in-competition doping tests were carried out and at what time unannounced in-training tests were started in the federation concerned. DENHAM provides a historic overview of how Sports Illustrated, a magazine with an average circulation of approximately 5 million, reported the use of steroids in athletics during the 1980s. The study then addresses agenda building as a theory of mass media, and finally moves into a discussion of government hearings and policy. JACKSON uses the Ben Johnson doping case as the starting point for examining the political and discursive formation of national identity. The public perception of doping among the Swiss population is the topic of the article by NOCELLI et al. The authors arrive at the conclusion that only a few parents would hold back their children from sport because of the risks of doping. An interesting point of view is taken by BEUKER. He states that while in the general society the intake of ergogenic substances to improve one's performance is not forbidden, such behaviour is banned in sport because of the principle of fairness. However, according to his point of view, the chemical influence of natural abilities is basically not different from the modulation of performance through athletic training, which only aims at the stimulation and development of the physical possibilities. Not every athlete is able to train as extensively as his or her competitors. So training is actually a violation of the fairness principle, too, because the conditions of the different athletes are unequal and different prerequisites are developed in a different way. In the case of doping, the athlete is labeled as the chief offender, whereas society as the actual basis of the athlete's behaviour is neither punished nor even found guilty.

The articles included in chapter 4 deal with legal aspects of doping from the point of view of

- **Penal law** (FRITZWEILER, HAAS/PROKOP, HEIKKALA, MESTWERDT, SCHLUND)
- **The law concerning liability** (IRA-FINGERHOOD et al., OLG DRESDEN, TARASTI)
- **The law of employment** (CAJSEL).

The legal protection of athletes in doping cases is discussed by ANDERSEN/AUBERG. Readers interested in legal aspects of doping in foreign countries should have a look at the articles by CAJSEL, KROGMANN, RÖTHEL, and VIEWEG.

Three of the altogether seven articles in chapter 5 deal explicitly with drug use in school students (DURANT et al., NUTTER, WALTER). Most of the articles focus on the use of anabolic-androgenic steroids (ANDERSON et al., DURANT et al., FRANCHINI et al., NUTTER, YESALIS et al.).

Most of the articles presented in chapter 6 discuss ethical aspects of doping in a rather general way. An interesting point of view is held by Angela SCHNEIDER who argues that in-training doping tests interfere with the personality rights of athletes. The author thinks that such an interference with personality rights is inadmissible and argues that in-training doping tests should be carried out by the athletes themselves while the federations should continue to carry out in-competition tests.

The publications included in the last chapter of this bibliography cover various and general aspects of doping in sport. Especially the following topics deserve attention:

- **The market perspective of doping** (BLACK/PAPE)
- **Coaches' education and estimation regarding drug use by athletes** (DENDUYN, ELLIOT et al.)
- **Physicians' knowledge of banned substances in sport** (GREENWAY/GREENWAY)
- **Doping and developing countries** (KIDANE)
- **Cause analysis of doping** (MERODE, PAI).
- **Preferred doping substances in student athletes** (PAN/BAKER).

The book edited by KURZ/MESTER deals with a variety of doping aspects and can therefore be recommended to those who are interested in a comprehensive survey.

This bibliography does not claim to be complete. It is to be understood only as a selection of publications giving the reader a rough overview of various aspects of the doping discussion from the year 1997 up to the present.

1. Beiträge zur Epidemiologie sowie zu den Wirkungen und Nebenwirkungen verschiedener Dopingsubstanzen / Publications about the epidemiology as well as the effects and side effects of various doping substances

Audran, M.; Gareau, R.; Matecki, S.; Durand, F.; Chenard, C.; Sicart, M.T.; Marion, B.; Bressolle, F. (BISp 990640111)

Effects of erythropoietin administration in training athletes and possible indirect detection in doping control

(Auswirkungen der Verabreichung von Erythropoietin an Sportler im Training und möglicher indirekter Nachweis in der Dopingkontrolle)

Med. & Sci. in Sports & Exerc., Madison (Wisc.) 31 (1999), 5; 639-645

Purpose: This study investigated the effects of subcutaneous injection of rHuEPO (50 IU/kg) in athletes and proposes a method based on the measurement in blood samples of the sTfr/serum protein ratio to determine if the observed values of this marker are related to rHuEpo abuse. Methods: Serum erythropoietin concentrations, and hematological and biochemical parameters were evaluated, during treatment and for 25 d post-treatment in nine training athletes. Moreover, the effect of rHuEpo administrations on the maximum

oxygen uptake and ventilatory threshold (VT) of these athletes was also studied. Threshold values for sTfr and the sTfr/serum protein ratio were determined from 233 subjects (185 athletes, 15 athletes training at moderately high altitude, and 33 subjects living at >30000 m). Results: Significant changes in reticulocytes, hemoglobin (Hb) concentration hematocrit (HcT), STfr, and sTfr/serum proteins were observed during and after rHuEpo treatment. The maximal heart rate of 177 beats/min at the beginning of the study was significantly higher than the value of 168 beats/min after 26 d of rHuEpo administration. Compared with the values measured at baseline, the VT measured after rHuEpo administration occurred at a statistically significant high level of oxygen uptake. Conclusions: When oxygen uptake measured at the VT was expressed as a percentage of VO₂max the values obtained were also significantly higher. The increased values of Tfr and sTfr/serum proteins, respectively, above 10 micro-g/ml and 153, indicated the probable intake of rHuEpo.

Baum, K. (BISp 981135663)

Substitution in Ausdauersportarten – Wem nützt es?

(Substitution in endurance sports – who benefits?)

Forsch. Innovat. Technol., Cologne (1998), 2; 10-13

Ausgehend von der Definition des Substitutionsbegriffs stellt Verf. die Problematik dar, diesen in der Praxis gegen die Kategorisierung von Doping abzugrenzen. Davon ableitend geht er auf den Energiebedarf ein, der bei Ausdauersportarten entsteht. Aufgrund von Literaturbefunden stellt er kritisch die Effektivität der Substitutionsmaßnahmen dar. Diese werden vor allem im Anwendungsfeld der Ausdauersportarten betrachtet. Detailliert betrachtet Verf. die Bedeutung von Vitaminen und Spurenelementen. Er macht hierzu ernährungsphysiologische Angaben, die auch den Flüssigkeitshaushalt berücksichtigen. So stellt er wichtige Punkte für eine angemessene Sportlerernährung zusammen.

The author defines the term "substitution" and shows how difficult it is in the practice of sport to distinguish between substitution and doping. The energy requirements in endurance sports are described and the effectiveness of substitution in these sports is discussed. The main focus is on the importance of vitamins and trace elements.

Bledsoe, J. (SIRC S-18247)

Here's what happens when you put a little ephedrine in your coffee

(Hier erfahren Sie, was geschieht, wenn Sie ein wenig Ephedrin in Ihren Kaffee tun)

Peak Perform., London (October 1998), 110; 1-3

Bressolle, F.; Audran, M.; Gareau, R.; Pham, T.N.; Gomeni, R. (SIRC S-21036)

Comparison of a direct and indirect population pharmacodynamic model:

Application to recombinant human erythropoietin in athletes

(Vergleich eines direkten und indirekten Populations-Pharmakodynamik-Modells:

Anwendung auf rekombinantes humanes Erythropoietin bei Sportlern)

J. of Pharmacokinet. & Biopharmaceut., New York 25 (1997), 3; 263-275

Brönnimann, M. (BISp 980733223)

Kreatin statt Doping

(Creatine instead of doping)

Leistungssport, Münster, 28 (1998), 4; 8-10

Kreatin besteht aus den drei Aminosäuren Glycin, Arginin und Methionin. Produziert in Leber, Niere und Pancreas kommt Kreatin zu 95% in der Skelettmuskulatur vor und wird dort vor allem als Energiequelle und Aufbaustoff gebraucht. Verf. wehrt sich gegen die

Bezeichnung der Kreatineinnahme als "legales Doping", denn 1. kann Doping nie legal sein und 2. paßt diese Bezeichnung nicht zu einer natürlichen Substanz, die auch im normalen Essen vorkommt und nach heutigem Wissen für den Körper unschädlich ist. Würde Kreatin auf die Dopingliste gesetzt, ginge den verantwortlichen Betreuern ein potentes Mittel verloren, das sie all jenen Athleten empfehlen können, die zur Leistungssteigerung etwas einnehmen möchten, ohne sich dabei zu schädigen. Stünde dieses Mittel nicht mehr zur Verfügung, würden sich viele Leistungssportler auf dem "Graumarkt" eindecken und entzögen sich dadurch der Kontrolle und Beratung sachverständiger Betreuer. Kreatin kann eine wirksame Alternative zu gefährlichen Mitteln wie Wachstumshormone und Anabolika sein. Verf. vertritt weiterhin die Auffassung, daß nur solche Substanzen auf der Dopingliste erscheinen sollten, die sich mit vernünftigem Aufwand kontrollieren lassen, was bei Kreatin als normalem Nahrungsbestandteil nicht der Fall ist. Bei der Anwendung von Kreatin im Sport geht es daher nicht um ein generelles Verbot, sondern um die Formulierung konkreter Rahmenbedingungen, unter denen diese stattfinden soll. Dazu gehört u.a. die Forderung, daß die Kreatin-Supplementierung in die Hand des Arztes gehört, zumindest bis sich die Kenntnisse über deren Wirkungen und Nebenwirkungen als Allgemeinwissen durchgesetzt haben.

According to the author creatine is not harmful and can therefore be an effective alternative to dangerous substance such as growth hormone or anabolic steroids. The author is also of the opinion that the doping list should include only substances which can be easily controlled. This is not possible with creatine which is a part of normal nutrition. However, creatine supplementation should be controlled by a physician at least until the knowledge about effects and side effects has become general knowledge.

Clarkson, P.M.; Thompson, H.S. (BISp 980128961)

**Drugs and sport – research findings and limitations
(Pharmaka und Sport – Forschungsergebnisse und Grenzen)**

Sports Med., Auckland 24 (1997), 6; 366-384

Many types of drugs are used by athletes to improve performance. This paper reviews the literature on 3 categories of drugs: those that enhance performance as stimulants (amphetamines, ephedrine, and cocaine), those that are used to reduce tremor and heart rate (beta-blockers) and those involved in body weight gain or loss (anabolic-androgenic steroids, growth hormone, beta2-agonists, and diuretics). Limitations of research on these drugs as they relate to performance enhancement are also discussed. The numerous studies that have assessed the effects of amphetamines on performance report equivocal results. This may be due to the large interindividual variability in the response to the drug and the small sample sizes used. Most studies, however, show that some individuals do improve exercise performance when taking amphetamines, which may be attributed to their role in masking fatigue. As a stimulant, ephedrine has not been found to improve performance in the few studies available. More recently, ephedrine has been purported to be effective as a fat burner and used by athletes to maintain or improve muscle mass. Although research on individuals with obesity supports the use of ephedrine for fat loss, no studies have been done on athletes. The few studies of cocaine and exercise suggest that little to no performance gains are incurred from cocaine use. Moreover, the sense of euphoria may provide the illusion of better performance when, in reality, performance was not improved or was impaired. Beta-blockers have been found to reduce heart rate and tremor and to improve performance in sports that are not physiologically challenging but require accuracy (e.g. pistol shooting). However, there is evidence that some individuals may be high responders to beta-blockers to the extent that their heart rate response is so blunted as to impair performance. Although equivocal, several studies have reported that anabolic-androgenic steroids increase muscle size and strength. However, most studies

are not well controlled and use insufficient drug doses. One recent well controlled study did find an increase in muscle mass and strength with supraphysiological doses, and the improvements were greater in participants who were also resistance training. There is little information available on the effects of growth hormone on muscle mass or performance in athletes, although data suggest that growth hormone administration does not increase muscle protein synthesis. Beta2-agonists, such as clenbuterol and salbutamol, when administered orally appear to improve muscular strength due to their potential role in increasing muscle mass. However, studies have not been done using athletes. Diuretics result in a loss of body water and hence body weight that can be advantageous for sports with strict body weight classifications. There is insufficient evidence on possible performance decrements in the field that could result from dehydration induced by the diuretics. Overall, the most significant concern in studies of drug use is the large inter-individual variability in responses to a drug. Further studies are needed to understand why some individuals are more responsive than others and to assess whether the responses are consistent for a given individual. Most studies of drug effectiveness have not used athletes. The effectiveness of many drugs may be reduced in highly trained athletes because there is lower margin for improvement.

Clasing, D. (BISp 971228753)

**Erythropoietin
(Erythropoietin)**

Dt. Z. f. Sportmed., Cologne 48 (1997), 11/12; 452, 455-457

Seit den Olympischen Spielen (OS) Calgary 1988 dreht sich die Diskussion um den Einsatz verbotener Wirkstoffe im Sport im wesentlichen um die unerlaubte Gabe von Erythropoietin zur Verbesserung der Ausdauerleistungsfähigkeit. Vorläufer dieser Manipulation waren Bluttransfusionen. Hier werden einige Hinweise gegeben, die die sportbezogene Problematik der möglichen Beeinflussung näher erläutern.

Since the Olympic Games in Calgary in 1988 the focus of the discussion about doping in high-performance sport has been on the unallowed administration of erythropoietin for improving the endurance performance in sport. The precursor of this manipulation were blood transfusions. In this article some hints are given on how erythropoietin can be used to influence sport performances.

Dawson, R.T.; Harrison, M.W. (SIRC 454867)

**Use of insulin as an anabolic agent (letter)
(Die Verwendung von Insulin als anabole Substanz (Brief))**

Brit. J. of Sports Med., Oxford 31 (September 1997), 3; 259

Di, J.; Yang, P. (SIRC 478613)

**(Athletics with anabolic steroids)
(Sport mit anabolen Steroiden)**

J. of Xi'an Institute of phys. Educ., Xi'an 15 (1998), 1; 92-96

In order to enhance performance effects and competition results, anabolic steroids have been widely spread in the athletic community. This paper summarizes the literature about anabolic steroids (biochemistry, physiological effects, functions, adverse influences on the human body) as well as possible future developments of doping in sport.

Eckardt, K.U. (BISp 980330340)

**Erythropoietin: Karriere eines Hormons
(Erythropoietin: Career of a hormone)**

Dt. Ärztebl., Cologne 95 (1998), 6; B-245-B-250

Durch sauerstoffabhängige Produktion des Hormons Erythropoietin (EPO) steuert die Niere die Neubildungsrate von Erythrozyten. Inadäquat niedrige EPO-Produktion führt bei chronischen Nierenerkrankungen zur Entwicklung einer Anämie. Seit zehn Jahren steht gentechnologisch hergestelltes rekombinantes EPO (rhEPO) für den therapeutischen Einsatz zur Verfügung. Die renale Anämie lässt sich damit in nahezu allen Fällen effektiv behandeln. Auch die Frühgeborenenanämie sowie die Entzündungs- und Tumoranämie, bei denen die EPO-Antwort der Niere reduziert sein kann, können in vielen Fällen mit rhEPO gebessert werden. Selbst bei völlig intakter endogener EPO-Produktion kann durch EPO-Therapie eine zusätzliche Stimulation der Erythropoese induziert werden, was bei Eigenblutspendern ausgenutzt wird. Der geschätzte weltweite jährliche Umsatz von rhEPO liegt jetzt schon bei 2000 Millionen Dollar, und eine kostengünstigere Herstellung würde einen weiter zunehmenden Einsatz des Hormons ermöglichen.

The new formation of erythrocytes is controlled by the kidneys through the oxygen-dependent production of the hormone erythropoietin (EPO). An inadequately low production of EPO caused by chronic renal diseases leads to the development of anemia. Recombinant human EPO (rhEPO), which is produced through genetic engineering, has been available for therapeutic use for ten years.

Eichner, E.R. (SIRC 413530)

Ergogenic aids: what athletes are using – and why?

(Leistungsunterstützende Hilfen: Was Sportler einsetzen und warum?)

Physician & Sports Med., New York 25 (April 1997), 4; 70-76, 79, 83

Athletes at all levels explore ergogenic aids. Testosterone and growth hormone are still abused and difficult to detect. Single doses of albuterol or salmeterol do not seem ergogenic, but questions remain about prolonged dosing and about other beta2 agonists. Caffeine can be ergogenic for prolonged or brief exertion. Creatine supplementation is legal and in vogue among strength and power athletes. Not all studies agree, but creatine seems ergogenic for repeated brief bouts of intense exercise. Ergogenic aids pose vexing questions for athletes, physicians, and society.

Eichner, E.R. (SIRC 415259)

Ergogenic aids

(Ergogene Hilfen)

N.Z. J. of Sports Med., Auckland 25 (Autumn 1997), 1; 9-13

Elkin, S.L.; Brady, S.; Williams, I.P. (SIRC 457336; 457703)

Bodybuilders find it easy to obtain insulin to help them in training (letter)

(Bodybuilder haben keine Schwierigkeiten, an Insulin als Trainingshilfe zu gelangen (Brief))

Brit. Med. J., London 314 (26 April 1997), 7089; 1280

Evans, N.A. (BISp 971127992)

Gym and tonic: A profile of 100 male steroid users

(Sporthalle und Tonikum: Ein Profil von 100 männlichen Steroidkonsumenten)

Brit. J. of Sports Med., Loughborough 31 (1997), 1; 54-58

Objective: To identify unsupervised anabolic steroid regimens used by athletes. Methods: 100 athletes attending four gymnasias were surveyed using an anonymous self administered questionnaire. Results: Anabolic steroid doses ranged from 250 to 3200 mg

per week and users combined different drugs to achieve these doses. Injectable and oral preparations were used in cycles lasting four to 12 weeks. Eighty six per cent of users admitted to the regular use of drugs other than steroids for various reasons, including additional anabolic effects, the minimisation of steroid related side effects, and withdrawal symptoms. Acne, striae, and gynaecomastia were the most commonly reported subjective side effects. Conclusions: Multiple steroids are combined in megadoses and self administered in a cyclical fashion. Polypharmacy is practised by over 80% of steroid users. Skeletal muscle hypertrophy along with acne, striae, and gynaecomastia are frequent physical signs associated with steroid use.

Evans, N.A. (BISp 980229763)

**Local complications of self administered anabolic steroid injections
(Lokale Komplikationen nach selbstverabreichten Injektionen mit anabolen Steroiden)**

Brit. J. of Sports Med., Loughborough 31 (1997), 4; 349-350

In addition to the pharmacological side effects of anabolic steroids, complications may also result from the injection technique used in self administration. Two cases are presented where anabolic steroid injections resulted in knee joint sepsis and radial nerve palsy.

Falkenberg, M.; Karlsson, J.; Ortenwall, P. (SIRC 416680)

**Peripheral arterial thrombosis in two young men using anabolic steroids
(Periphere Arterienthrombose bei zwei jungen, anabole Steroide konsumierenden Männern)**

Europ. J. of vasc. and endovasc. Surg., London 13 (February 1997), 2; 223-226

Faraj, A.A. (BISp 981235794)

**Triceps tendon rupture in a weight lifter on anabolic steroid – case report
(Ruptur der Triceps-Sehne bei einem anabole Steroide konsumierenden Gewichtheber – Fallbericht)**

Sports Exerc. & Injury, Edinburgh 4 (1998), 2/3; 140-141

A case of acute triceps rupture of the right elbow in a professional weight lifter is presented. The patient admitted regular anabolic steroid intake. The injury was diagnosed by clinical examination, X-ray of the elbow showed a flake of bone avulsed from the olecranon process, this was migrated proximally. The rupture was at the tendinous attachment to the olecranon process, early repair was followed by a good outcome. The above combination should be appreciated by weight lifters. Parenteral anabolic injection can have an adverse effect on the triceps tendon.

Ferreira, M.P (BISp 990640064)

**Creatine supplementation for female athletes: A call for research
(Kreatinzufuhr bei Sportlerinnen: Eine Aufforderung zu intensiverer Forschung)**

Nat. Strength & Condit. Assoc. J., Lincoln (Nebr.), 21 (1999), 2; 63-64

The merit of creatine supplementation as an ergogen has received considerable attention over the past decade from sport scientists, coaches, and athletes. Conclusions that can be drawn from the current literature regarding creatine supplementation suggest that creatine supplementation at high doses can increase intramuscular stores of creatine and phosphocreatine; increase adenosine triphosphate resynthesis rates; improve high-intensity repetitive work performance; increase lean body mass; and improve isotonic strength performance. The overwhelming majority of human studies that have addressed

these issues have used male subjects. Although it is commonly assumed that the results of studies utilizing male subjects can be generalized to women, such assumptions may not always be true. It is therefore important that sport professionals address the specific issue of creatine use by female athletes, as well as the more general issue of exploring gender differences in all exercise and sport science research.

Ferrera, P.C.; Putman, D.L.; Verdile, V.P. (SIRC 450508)

**Anabolic steroid use as the possible precipitant of dilated cardiomyopathy
(Die Anwendung anaboler Steroide als möglicher Auslöser einer krankhaften
Herzdilatation)**

Cardiol., Basel 88 (March/April 1997), 2; 218-220

Fuerst, M.L. (SIRC 449829)

**College athletes using steroids less, marijuana more
(Collegesportler verwenden weniger Steroide, dafür jedoch mehr Marihuana)**

Physician & Sports Med., New York 25 (December 1997), 12; 21

Gotzmann, A.; Mareck-Engelke, U. (BISp 990338082)

**Doping und Dopinganalytik. Anabolika im Frauensport – starke Wirkung auf's
"schwache Geschlecht"**

**(Doping and doping analytics. Anabolics in women's sport – strong effect on the
"weak sex")**

Kölner Forum "Frauen in Bewegung". Cologne: Cologne Univ., 1998. 20-27 = Frau und Hochschule; Bd. 1998,1

Die z.T. gravierenden Nebenwirkungen anaboler Steroide bei Frauen und Jugendlichen werden beschrieben.

The side effects of anabolic steroids in women and young athletes, some of which are very severe, are described.

Grucza, R.; Chrostowski, K.; Kwiatkowska, D.; Pokrywka, A.; Chajewski, A. (BISp 980531833)

Changes of steroid profiles in male and female athletes

(Änderungen im Steroidprofil von Sportlern und Sportlerinnen)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 91-98, ISBN 3-89001-016-4

The aim of the present work was to compare the distribution of T/E ratios in male and female athletes who were routinely tested, according to the anti-doping procedures, in the Department of Antidoping Research of the Institute of Sport in Warsaw. The data were analysed for the period from 1991 to 1996. Additionally, the ratio of androsterone to etiocholanolone (A/E) was examined in these subjects. The A/E ratio has been regarded as an important indicator of natural androgen metabolism. If the value of A/E is close to 1.0, the androgen metabolism is assumed to be within the normal physiological range. If A/E is lower than 0.5, this may be an indication of some changes in the androgen metabolism.

Healy, M.L.; Russell-Jones, D. (SIRC 454754)

**Growth hormone and sport: Abuse, potential benefits, and difficulties in detection
(Wachstumshormon und Sport: Mißbrauch, potentielle Vorteile und Schwierigkeiten
des Nachweises)**

Brit. J. of Sports Med., Oxford 31 (December 1997), 4; 267-268

Heck, H.; Schulz, H. (BISp 980229733)

Ergogene Hilfen: Doping oder Substitution? Problematisiert am Beispiel der Kreatin-Supplementation

(Ergogenic aids in sport: Doping or substitution? Discussed using the example of creatine supplementation)

Doping im Sport – zwischen biochemischer Analytik und sozialem Kontext. Symposium, Köln, 4. Nov. 1995, in memoriam Prof. Dr. Manfred Donike. Cologne: Sport & Buch Strauß, 1997. 29-45, ISBN 3-89001-047-4

Bei Anwendung der Dopingdefinition des IOC und der meisten Sportverbände ist die hochdosierte Kreatinsupplementierung kein Doping, denn Kreatin steht nicht auf der Liste der verbotenen Stoffe. Alles, was nicht direkt verboten ist, ist aber gemäß dieser pragmatischen Definition erlaubt. Die hochdosierte Gabe von Kreatin ist jedoch auch nicht dem Begriff Substitution zuzuordnen. Denn darunter ist entsprechend der Definition des Deutschen Sportärztebundes nur der Ersatz von Stoffen für den Energie- und Baustoffwechsel des Körpers zu verstehen. Der Sporttreibende, auch der Hochleistungssporttreibende, hat kein Defizit an Kreatin, das eine 20-30fache Dosis der normalen Aufnahme begründen könnte. Häufig wird als Argument für eine hochdosierte Gabe (Supplementierung) von ergogenen Stoffen die gesundheitliche Bedeutung hervorgehoben. So wird für ergogene Substanzen wie Vitamine und vitaminähnliche Stoffe der präventive Charakter der Supplementierung mit einer antioxidativen, immunstimulierenden, regenerationsfördernden und ähnlichen Wirkungen begründet, wobei für die meisten Präparate der Wirksamkeitsnachweis im Sport noch aussteht. Eine präventive Wirkung von hochdosiertem Kreatin ist nicht erkennbar. Somit hat die hochdosierte Kreatinaufnahme für Sportler und Trainer nur den einen Zweck: Steigerung der Wettkampfleistungsfähigkeit. Unter diesem Aspekt stellt die Kreatinsupplementierung Doping dar, wenn man die Dopingdefinition des Europarates von 1963 berücksichtigt, in der die Verabreichung physiologischer Substanzen in abnormaler Form unter den Tatbestand des Dopings fällt. Unabhängig davon deuten die Befunde von WIEBKE et al. darauf hin, daß möglicherweise gesundheitliche Beeinträchtigungen Folge der Kreatinsupplementierung sein können. Aus diesen Gründen sollten die nationalen und internationalen Sportverbände sowie das IOC Kreatin in die Liste der verbotenen Wirkstoffgruppen aufnehmen.

According to the doping definition of the IOC and most sport federations the supplementation with high doses of creatine is not doping because creatine is not included in the list of forbidden substances. According to this pragmatic definition everything which is not directly forbidden is allowed. However, the administration of high doses of creatine cannot be understood as substitution either because athletes do not suffer from creatine deficiency. The only reason for giving athletes high doses of creatine is to increase their performance. From this point of view creatine supplementation is doping if one takes into account the doping definition by the Council of Europe in 1963. According to this definition the administration of physiological substances in an abnormal form is to be considered as doping. Therefore the authors conclude that the national and international sport federations as well as the IOC should include creatine into the list of forbidden substances.

Honour, J.W. (SIRC 452619)

Steroid abuse in female athletes

(Steroidmißbrauch bei Sportlerinnen)

Curr. Opinion in Obstetr. & Gynecol., Philadelphia 9 (June 1997), 3; 181-186

Honour, J.W. (SIRC 453136)

**Misuse of natural hormones in sport
(Mißbrauch natürlicher Hormone im Sport)**

Lancet, London 349 (21 June 1997), 9068; 1786

IOC Medical Commission (BISp 971027748)

Doping

Olymp. Rev., Lausanne 26 (1997), 14; 50-53

Eine vom IOC (International Olympic Committee) erweiterte Liste von chemischen Präparaten, die als unzulässige Dopingsubstanzen gelten, wird vorgestellt. Es wird eine Klassifizierung der Stoffe vorgenommen und Beispiele genannt.

In this article the IOC's list of chemical substances which are considered as doping agents is presented.

Jenkins, A.P. (SIRC 412680)

Herbal energizers: Speed by any other name

(Pflanzliche Energiespender: Schnelligkeit unter anderem Namen)

J. of phys. Educ. Recreat. & Dance, Reston (Va.) 68 (February 1997), 2; 39-45

Kamber, M.; Marti, B.; Peters, M. (BISp 980229780)

**Nachfrage, Verschreibung und Abgabe von hormonalen Dopingmitteln in
Arztpraxen und Apotheken der Deutschschweiz**

**(Request, prescription and sale of hormonal doping substances with medical
doctors and pharmacists in the German speaking part of Switzerland)**

Schweiz. Z. f. Sportmed. u. Sporttraum., Bern 45 (1997), 4; 187-191

In a representative telephone survey 300 medical doctors (general and internal medicine, orthopedics, surgery; response rate 63 percent) and 150 pharmacists (response rate 85 percent) of the German speaking part of Switzerland were interviewed about their experience with doping in sport within the last six months. The frequency of being asked for testosterone and peptide hormones, the sociodemographic profile of the questioners, the handling of the requests, the practice of prescription of such substances, as well as the possible lack of information on doping substances were part of the ten items questionnaire. 22 percent of the medical doctors and 23 percent of the pharmacists were confronted by 113 (medical doctors) respectively 50 (pharmacists) persons with a request for testosterone. Persons asking for testosterone were mostly men between 20 and 40 years old and belonged predominantly to the group of either younger bodybuilders or middle aged fitness sportsmen. About one in four medical doctors (but not any pharmacist), who was asked for testosterone, gave it on request. Less than 10 percent of medical doctors and pharmacists were called for peptide hormones like growth hormone (GH) or erythropoietin (EPO). Requesters (31 with medical doctors, 14 with pharmacists) were predominantly young men around 30 years, being either top athletes or bodybuilders. Most of the physicians and pharmacists found it easy to handle such requests. Testosterone was prescribed by 32 percent of the physicians to overall 171 persons and 48 percent of the pharmacists handed it out to 191 persons with a prescription for it. The main reasons for a prescription were illness or convalescence for all ages and in only two cases "sporting reasons" were indicated, nevertheless, for people below 45 years (60 prescriptions by medical doctors, 46 sales by pharmacists) doping cannot be excluded definitively. Only about 5 percent of the physicians prescribed peptide hormones to 36 persons and 11 percent of the pharmacists gave it to 19 persons with a prescription. The main group receiving peptide hormones were sick and convalescent people beyond midlife. The majority of physicians and pharmacists judged their

colleagues' practice to prescribe testosterone or peptide hormones as restricted. Most of the respondents state that they are enough informed about doping, but 32 percent of the physicians and 27 percent of the pharmacists would like to receive more information about a wide range of subjects. Among the topics, information about doping in general, about its effects and side effects, about black market and possible new doping substances were most often mentioned. From a given list, the Swiss society of sports medicine was the most frequently cited possible provider for such information. In general, the responding medical doctors and pharmacists were confronted quite often with requests for doping but they could handle it. Doping with testosterone can only be suspected for a minority of the prescriptions. All in all the data of the survey do not indicate Swiss physicians and pharmacists as quantitatively important sources for doping. Although the state of information is mostly high, special information on specific topics have to be considered.

Ketchum, B.J. (SIRC 463332)

**Nandrolones
(Nandrolone)**

EndurePlus, Toronto (Ont.) 3 (June 1998), 1; 9, 4

Knopp, W.D.; Wang, T.W.; Bach, B.R. (BISp 971027467)

**Ergogenic drugs in sports
(Leistungssteigernde Pharmaka im Sport)**

Clin. in Sports Med., Philadelphia (Penn.), 16 (1997), 3; 375-392

This article provides the practicing physician with an account of the commonly used ergogenic substances. Specific agents discussed include the following: stimulants, narcotic analgesics, anabolic-androgenic steroids, beta-blockers, diuretics, growth hormone, other peptide hormones, blood doping, and erythropoietin.

Korkia, P. (SIRC 458794)

**Anabolic-androgenic steroids and their uses in sport and recreation
(Anabol-androgene Steroide und ihr Einsatz in Sport und Freizeit)**

J. of Substance Misuse, London 2 (1997), 3; 131-135

Korkia, P.; Stimson, G.V. (BISp 971128183)

**Indications of prevalence, practice and effects of anabolic steroid use in Great Britain
(Anzeichen des Umfangs, der Anwendung und der Auswirkungen des Konsums anaboler Steroide in Großbritannien)**

Int. J. of Sports Med., Stuttgart 18 (1997), 7; 557-562

A growing number of reports of anabolic-androgenic steroid (AS) use in Great Britain (GB) among non-competitive groups have emerged since the beginning of 1990s. A study was commissioned by the Departments of Health for England, Scotland and Wales, to explore the extent and uses of AS from the public health point of view. As a part of a wider investigation into AS use, 21 gymnasias in England, Scotland and Wales were surveyed by questionnaire. The response rate was 59%. The authors found that of the 1667 participants, 9.1% of the men and 2.3% of the women had taken AS at some time and 6% of the men and 1.4% of the women were current users. Considerable variation in the prevalence of use was found, ranging from no reports in three of the gymnasias, up to 46%. The authors also investigated patterns of AS use and perceived side effects in a wide-

ranging group of AS users (n=110), who were recruited through social networks. In-depth interviews with the users revealed that the 97 men (27±7 years) and 13 women (25±5 years) had been using AS regularly for 2.05±1.7 years and 1.9±2 years, respectively. Seventy-two injected AS. While most injected themselves, 25% were mainly injected by their friend. Up to 16 different drugs were taken by interviewees during the present or last cycle. Polydrug use was common and dosage taken exceeded therapeutic recommendations. Sixteen interviewees did not report side effects, while the majority reported two or more. Many of these were cosmetic. Of the 97 men interviewed, 56% reported testicular atrophy, 52% gynaecomastia, 36% elevated blood pressure, 56% fluid retention, 26% injuries to tendons, 22% nosebleeds and 16% more frequent colds. Six men reported problems with kidney function and five with liver function. Problems with sleep were reported by 37%. Of the 13 women interviewed, eight reported menstrual irregularities, eight fluid retention, four clitoral enlargement, three decreased breast size and two elevated blood pressure. Four reported sleeplessness.

Kovacs, E.M.R.; Stegen, J.H.C.H.; Brouns, F. (BISp 980934332)

Effect of caffeinated drinks on substrate metabolism, caffeine excretion, and performance

(Auswirkung koffeinhaltiger Getränke auf den Substratstoffwechsel, die Koffeinausscheidung und die körperliche Leistung)

J. of appl. Physiol., Bethesda (Maryld.), 85 (1998), 2; 709-715

The effect of addition of different dosages of caffeine (Caf) to a carbohydrate-electrolyte solution (CES) on metabolism, Caf excretion, and performance was examined. Subjects (n=15) ingested 8 ml/kg of water placebo (Pla-W), 7% CES (Pla-CES), or 7% CES with 150, 225, and 320 mg/l Caf (CES-150, CES-225, and CES-320, respectively) during a warm-up protocol (20 min) and 3 ml/kg at one-third and two-thirds of a 1-h time trial. Performance was improved with Caf supplementation: 62.5±1.3, 61.5±1.1, 60.4±1.0, 58.9±1.0, and 58.9±1.2 min for Pla-W, Pla-CES, CES-150, CES-225, and CES-320, respectively. The post-exercise urinary Caf concentration (range 1.3-2.5 micro-g/ml) was dose dependent and always far below the doping level of the International Olympic Committee (12 micro-g/ml) in all subjects. Sweat Caf excretion during exercise exceeded post-exercise early-void urinary Caf excretion. Caffeinated CES did not enhance free fatty acid availability, ruling out the fact that performance improvement resulted from enhanced fat oxidation. It is concluded that addition of relatively low amounts of Caf to CES improves performance and that post-exercise urinary Caf concentration remained low.

Kreider, R.B. (BISp 990338057)

Dietary supplements and the promotion of muscle growth with resistance exercise
(Nahrungszusätze und die Förderung des Muskelwachstums durch Krafttraining)

Sports Med., Auckland 27 (1999), 2; 97-110

Nutritional strategies of overfeeding, ingesting carbohydrate/protein before and after exercise, and dietary supplementation of various nutrients (e.g. protein, glutamine, branched-chain amino acid, creatine, leucine, beta-hydroxy beta-methylbutyrate (beta-HMB), chromium, vanadyl sulfate, boron, prasterone (dehydroepiandrosterone (DHEA)) and androstenedione) have been purported to promote gains in fat-free mass during resistance training. Most studies indicate that chromium, vanadyl sulfate and boron supplementation do not affect muscle growth. However, there is evidence that ingesting carbohydrate/protein prior to exercise may reduce catabolism during exercise and that ingesting carbohydrate/protein following resistance-exercise may promote a more anabolic hormonal profile. Furthermore, glutamine, creatine, leucine, and calcium beta-HMB may affect protein synthesis. Creatine and calcium beta-HMB supplementation during

resistance training have been reported to increase fat-free mass in athletic and non-athletic populations. Prasterone supplementation has been reported to increase testosterone and fat-free mass in non-trained populations. However, results are equivocal, studies have yet to be conducted on athletes, and prasterone is considered a banned substance by some athletic organisations. This paper discusses the rationale and effectiveness of these nutritional strategies in promoting lean tissue accretion during resistance training.

Kuipers, H.; Hartgens, F. (SIRC 481855)

Gebruik van geneesmiddelen voor het verbeteren van sportprestaties

(Der Einsatz von Pharmaka zur Steigerung der sportlichen Leistung/Use of drugs to improve athletic performance)

Nederlands Tijdschrift voor Geneeskunde, Netherlands 141 (1997), 41; 1965-1968

Lafarge, P.; Egloff, M.; Marquet, P.; Chassain, A.P.; Galen, F.X.; Habrioux, G. (BISp 970927231)

Effets de la dexaméthasone sur les hormones surrénaliennes chez le sujet sain à l'effort

(Auswirkungen von Dexamethason auf die Nebennierenhormone von gesunden Personen unter körperlicher Belastung/Effects of dexamethasone on the adrenal hormones of healthy persons during exercise)

Sci. et Sports, Paris 12 (1997), 2; 99-114

Dexamethasone (Dex) effects on adrenal steroid plasma levels at rest and after exercise, and on the 24 hours urinary elimination of their metabolites have been studied using randomized, double-blind, placebo-controlled latin square repetition protocol involving 24 healthy men, aged 20 to 38, with various training status. Each volunteer received in random order at 3 weeks intervals a placebo (P), a low dose (LD = 0.5 mg) and a high dose (HD = 1.5 mg) of Dex, twice a day for 4 days. On the 5th day morning of each treatment period, blood samples were drawn from an antecubital vein after 1 hour of lying rest. Then the volunteers performed an incremental maximal cycling exercise, 12 to 18 minutes long and identical over the three periods, in the same time and dietary conditions. Another blood sampling was performed within 2 minutes after the end of effort. After having performed the first morning urine, all urines were collected for 24 hours. Analysis of variance showed a significant decrease in plasmatic concentrations of dehydroepiandrosterone (DHA), of its sulphate ester (SDHA) and of androstenedione (AD), at rest and after exercise under Dex. Whatever the treatment, physical exercise induced an increase in DHA and AD plasma levels. It could be verified that Dex did not modify the urinary excretion of testosterone (T) and epitestosterone (ET) nor their ratio T/ET. Conversely, urinary excretion of 11-hydroxyandrosterone (11OHA), 11-hydroxyetiocholanolone (11OHE) and 11-cetoetiocholanolone (11KE) was significantly decreased under Dex. But, under placebo, 11 KE urinary excretion was significantly lower in the "sportive" subgroup than in the "non-sportive" one, and was not further lowered by Dex intake. Androsterone (A) and etiocholanolone (E) had lower urinary excretion under Dex while urinary excretion ratios A/OHA, E/OHE and E/KE were increased in most subjects. Thus, Dex intake could eventually be pointed out either by measuring plasma concentrations of DHAS, SDHA or AD, or by determining urinary A/OHA, E/OHE and E/KE ratios. The present results led us to determine the following conditions under which an intake of Dex is presumed: $DHA < 3.0 \text{ ng/mL}$; $SDHA < 1220 \text{ ng/mL}$; $AD < 0.8 \text{ ng/mL}$; $A/11OHA > 6$; $E/11OHE > 25$; $E/11KE > 15$. Only the combination of A/11OHA and E/11KE or the combination of E/11OHE and E/11KE led us to eliminate any false positive and false negative in this study. These results need to be further validated by a study extended to a wider population and to other xenobiotic corticoids.

Larsson, K.; Gavhed, D.; Larsson, L.; Holmer, I.; Jorfelt, L.; Ohlson, P. (BISp 980229800)
Influence of a beta2-agonist on physical performance at low temperature in elite athletes

(Einfluß eines Beta2-Agonisten auf die körperliche Leistung von Spitzensportlern unter Kältebelastung)

Med. & Sci. in Sports & Exerc., Madison (Wisc.) 29 (1997), 12; 1631-1636

Beta2-Agonists are frequently used by elite cross-country skiers, a group of athletes with a high prevalence of asthma. It has been claimed that beta2-agonists have a positive effect on physical performance. The aim of the present study was to investigate whether inhalation of a beta2-agonist increases physical performance at low temperature in healthy, non-asthmatic athletes with normal bronchial responsiveness. Twenty elite male athletes (cyclists, cross-country skiers, middle and long distance runners) with no history of allergy or airway disease and who had normal spirometry and methacholine bronchial provocation tests performed a maximal exercise test on a treadmill in a climate chamber at ca. 10°C on two subsequent days. Before exercise they inhaled terbutaline (3 mg from MDI) or placebo in a randomized, single blind manner. After 10-min warm-up on the treadmill, a submaximal work preceded a stepwise increase of the workload until exhaustion. Lung function, ventilation, oxygen uptake, and heart rate were determined and blood samples for lactate and potassium analyses were drawn before, during, and after exercise. Terbutaline induced a significant bronchodilatation; FEV1 increased from 4.8 (4.4-5.1) L to 5.0(4.6-5.4) L, mean (95% CI). There were no significant differences between the two treatments with regard to exercise time, 25.1(24.3-25.8) min vs 24.9 (24.1-25.6) min, oxygen uptake and ventilation during exercise, or heart rate at maximal workload. Terbutaline induced an increase in serum lactate concentration but did not influence the lactate response to exercise. The serum potassium increase was attenuated at low work load but not at maximal work. The post-exercise decrease in serum potassium concentration was significantly greater after terbutaline (-0.52 (-0.29 to -0.76) mmol/L) than after placebo (-0.13 (0.06 to -0.32) mmol/L (P<0.001). The authors conclude that inhalation of a beta2-agonist (terbutaline) in a dose that yields significant bronchodilatation does not influence physical performance at low temperature in healthy athletes. Acute inhalation of the beta2-agonist amplified the post-exercise hypokalemia, a finding of unclear significance. Although there is a slight bronchodilation and potential negative airways effect of cold air inhalation, a beta2-agonist does not increase physical performance in top athletes.

Laura, R. (SIRC 465621)

Human growth hormone – the latest sporting evil

(Menschliches Wachstumshormon – das neueste Übel im Sport)

Triathlon Sports, Sydney 13 (1998), 7; 16-18

Laure, P. (BISp 971228606)

Epidemiologic approach of doping in sport

(Epidemiologische Aspekte des Dopings im Sport)

J. of Sports Med. & phys. Fitness, Turin 37 (1997), 3; 218-224

The purpose of this paper was to determine the prevalence of doping in sport as it was reported by the athletes during surveys, and to try to isolate risk factors in connection with doping. The experimental design was a MEDLINE, PASCAL and EMBASE search for the period from 1980 to 1996. The data shows that among children, doping prevalence is around 3-5 percent. Among adults, in self-reported use studies, doping prevalence may be estimated at 5-15 percent, where projected use studies report a mean prevalence near 15-25 percent. Studies provide few data about the sports that produce drug users.

Because of the extent of doping in sport and its potential risks for health it must be considered as a problem of public health.

Lavoie, C.; Diguët, A.; Milot, M.; Gareau, R. (BISp 980632379)

Erythropoietin (rHuEPO) doping: Effects of exercise on anaerobic metabolism in rats

(Doping mit rekombinantem menschlichem Erythropoietin: Auswirkungen von körperlichem Training auf den anaeroben Stoffwechsel bei Ratten)

Int. J. of Sports Med., Stuttgart 19 (1998), 4; 281-286

The purpose of this study was to investigate the effects of recombinant human erythropoietin (rHuEPO) administration on energy metabolism during exercise. Specifically, the contribution of anaerobic (glycogen) metabolism during exercise was evaluated. Sprague-Dawley rats were randomly assigned to an experimental (rHuEPO) (600 U/kg of Eprex, every 3 days) or control (equivalent volume of saline) group. After 15 days of treatment, animals from both groups were randomly subjected to either a 30-minute exercise (swimming with 5% body weight added) or resting period. They were sacrificed at the end of the exercise period. Their liver and muscles were quickly removed and frozen in liquid nitrogen. Blood was also sampled. rHuEPO administration resulted in a significant ($P < 0.05$) increase of hematocrit (from 42 ± 2 to 54 ± 7 L/L). In the rHuEPO group, both muscle glycogen and free fatty acids were higher whereas lactate was lower at the conclusion of the exercise period ($P < 0.05$). These results suggest that energy substrate utilization during exercise is affected by enhanced oxygen availability. Finally, a lower overall contribution to energy production from anaerobic metabolism during exercise followed rHuEPO administration.

McDowell, S.L.; Fleck, S.J.; Storms, W.W. (SIRC 416674)

The effects of salmeterol on power output in nonasthmatic athletes

(Die Auswirkungen von Salmeterol auf die Leistungsfähigkeit nichtasthmatischer Sportler)

J. of Allergy & clin. Immunol., St. Louis (Mo.) 99 (April 1997), 4; 443-449

Mickleborough, T. (SIRC 463289)

Victory or death. Part two

(Sieg oder Tod. Teil 2)

Triathlete, La Jolla (Cal.) (May 1998), 169; 52-54, 56, 88

Mondenard, J.-P. de (BISp 970625441)

La mort de la testostérone?

(Death caused by testosterone?/Tod durch Testosteron?)

Sport et vie, Quetigny (1997), 40; 28-29

Die Einnahme von Testosteron ist eine Form des Dopings und somit den Leistungssportlern untersagt. Testosteron ist jedoch nicht so leicht nachzuweisen. Verf. beschreibt die Probleme, die bei der Nachweisbarkeit dieses Mittels in den vergangenen Jahrzehnten auftraten und stellt die Entwicklung der Kontrollmethoden im Laufe der Zeit vor.

Although the administration of testosterone is considered as doping it is not easy to prove that athletes have taken this substance. The author describes the problems in connection with the verification of testosterone intake with athletes and shows how the control methods have developed in the course of time.

Mondenard, J.-P. de (BISp 970625445)

Doping: La clope qui dope?

(Is nicotine a doping substance?/Ist Nikotin ein Dopingmittel?)

Sport et vie, Quetigny (1997), 40; 29

Neben den gesundheitsschädlichen Einflüssen von Nikotin weist Verf. auch auf die leistungssteigernde Wirkung dieser Substanz hin und erläutert, warum dieser Stoff auf die Dopingliste gehört.

Apart from the unhealthy effects of nicotine the author describes some of its ergogenic effects and says why this substance should be included in the doping list.

Mondenard, J.P. de (BISp 990639941)

Substances et procédés dopants: Nandrolone (Nortestostérone, 19.

Norandrosténolone) "La molécule des podiums"

(Dopingsubstanzen und –verfahren: Nandrolon/Doping substances and procedures: Nandrolone)

Cinésiologie, Paris 37 (January/February 1998), 177; 27-29

Mondenard, J.-P. de (BISp 980532009)

Sur le front du dopage. La nandrolone superstar

(From the doping front. Nandrolone superstar/Von der Dopingfront. Superstar Nandrolon)

Sport et vie, Quetigny (1998), 46; 42-45

Die positiven Auswirkungen des Testosteronderivats 'Nandrolon' auf die sportliche Leistungsfähigkeit werden aufgezeigt. Seine Wirksamkeit reicht von der Zunahme der Muskelmasse über den stärkenden Einfluß auf die psychologische Konstitution bis hin zur Linderung von Gelenkschmerzen. Diese Merkmale ließen das Derivat des männlichen Sexualhormons zu einem der meist angewendeten Dopingpräparate werden.

The author shows the positive effects of the testosterone derivative nandrolone on sport performance. The effects of nandrolone include the increase of muscle mass, a positive effect on the athlete's psychology, and the alleviation of articular pain. These characteristics have made nandrolone one of the most frequently used doping substances.

Murphy, T.J. (SIRC 460021)

Victory or death. Part one: The basics of EPO

(Sieg oder Tod. Teil 1: Die Grundlagen des EPO)

Triathlete, San Francisco (Cal.) (April 1998), 168; 72-75

No author (SIRC 413957)

The use and misuse of EPO

(Gebrauch und Mißbrauch von EPO)

Orienteer. World, Sollentuna (February 1997), 1; 8

No author (SIRC 449819)

Androstenedione: The latest hormone supplement

(Androstendion: Das neueste hormonelle Ergänzungspräparat)

EndurePlus, Toronto 2 (June 1997), 6; 1-2, 10-11

No author (SIRC S-19122)

Anabolic steroids: Research dilemma

(Das Forschungsdilemma um anabole Steroide)

Sports Med. Digest, Hagerstown (Md.) 20 (July 1998), 7; 82

No author (SIRC 421206)

Survey shows steroid use on decline: Periodic study reveals increased consumption of amphetamines

(Eine Umfrage zeigt, daß der Steroidverbrauch zurückgeht: Eine periodische Untersuchung zeigt einen gesteigerten Amphetaminkonsum)

NCAA News, Overland Park (Kan.) 34 (15 September 1997), 32; 1, 16

No author (SIRC S-21057)

Le dopage a l'érythropoïétine ou l'utilisation détournée des progrès thérapeutiques (Doping with erythropoietin or misuse of new therapeutic advances/Doping mit Erythropoietin oder der Mißbrauch neuer therapeutischer Fortschritte)

Rev. méd. de Liège, Liège (Belgium) 53 (1998), 8; 499-502

Pandolf, K.B.; Young, A.J.; Sawka, M.N.; Kenney, J.L.; Sharp, M.W.; Cote, R.R.; Freund, B.J.; Valeri, C.R. (BISp 990136296)

Does erythrocyte infusion improve 3.2-km run performance at high altitude? (Verbessert eine Erythrozyteninfusion die Laufleistung über 3,2 km in großer Höhe?)

Europ. J. of appl. Physiol., Berlin 79 (1998), 1; 1-6

The effects of autologous erythrocyte infusion on improving exercise performance at high altitude have not previously been studied. The effects of erythrocyte infusion on 3.2-km (2-mile) run performance were evaluated during 3 days (HA3) and 14 days (HA14) exposure to high altitude (4300 m) in erythrocyte-infused (ER) and control (CON) subjects that were initially matched ($P > 0.05$, $n=8$ in each group) for age, body size and aerobic fitness. After sea-level runs (SL, 50 m), unacclimated-male subjects received either 700 ml of saline and autologous erythrocytes (42% hematocrit; ER) or saline alone (CON). The 3.2-km run times (min:s) did not differ ($P > 0.05$) between groups at SL (mean(SEM) ER, 13:14 (00:19); CON, 13:39 (00:32)) or during HA3 (ER, 19:02 (00:18); CON, 19:44 (00:43)) and HA14 (ER, 17:44 (00:27); CON, 18:45 (00:55)) but times were slower ($P < 0.05$) when comparing HA3 or HA14 to SL. Heart rates (HR) did not differ between groups at SL (ER, 188(3) beats/min; CON, 191(3) beats/min), or during HA3 (ER, 170(4) beats/min; CON, 178(4) beats/min) and HA14 (ER, 162(6) beats/min; CON, 169(5) beats/min), but HR were lower ($P < 0.05$) when comparing HA3 or HA14 to SL. Ratings of perceived exertion (local, central, and overall ratings) did not differ between groups at SL, HA3 or HA14, but local ratings were higher ($P < 0.05$) at HA3 and HA14 compared to SL, and overall ratings were higher for HA3 than SL. Analysis of covariance (adjusted for SL group run times) revealed (min:s) 00:14 (HA3) and 00:28 (HA14) mean improvement tendencies ($P > 0.05$) for ER compared to CON. Thus, no significant improvements in 3.2-km run performance were associated with erythrocyte infusion, although the ER group showed a tendency to run slightly faster at high altitude.

Peters, H.-D.; Fandrey, J. (BISp 990639942)

ERYPO: r-HuEPO. Erythropoietin human, rekombiniert. 3. Aufl. (ERYPO: r-HuEPO. Erythropoietin human, recombined. 3rd ed.)

Neuss: Janssen-Cilag, 1997. 175 pp.

Das rekombinant hergestellte Erythropoietin (r-HuEPO, Epoetin alfa, beta) ist ein Hormon

(Glykoprotein), welches dem endogen gebildeten Hormon immunologisch und biologisch weitgehend entspricht. R-HuEPO stimuliert wie das endogen gebildete Erythropoietin die Erythropoese dosisproportional. R-HuEPO regt einerseits die Proliferation der frühen Vorläuferzellen der roten Blutzellreihe an, andererseits wirkt es als Differenzierungsfaktor für determinierte Vorläuferzellen der Erythropoese und steuert deren Ausreifung zu Erythrozyten. Aus dem Inhalt: 1. Physiologie und Pathophysiologie der Erythropoietin-Bildung; Einflüsse auf die Erythropoese. 2. Strukturelle und biologische Eigenschaften von r-HuEPO. 3. Pharmakologie und Erythropoietin. 4. Klinische Anwendung von r-HuEPO. 5. Ausgewählte unerwünschte Wirkungen von r-HuEPO. 6. Dosierung und Hinweise zur Anwendung von r-HuEPO.

Recombinantly produced erythropoietin (r-HuEPO, epoetin alfa, beta) is a hormone (glycoprotein), which is very similar to the endogenously formed hormone as far as immunology and biology is concerned. Like endogenously formed erythropoietin R-HuEPO stimulates erythropoiesis proportionally to the dosage administered. On the one hand R-HuEPO stimulates the proliferation of the early precursor cells of the red blood cells. On the other hand it functions as a differentiating factor for certain precursor cells of erythropoiesis and regulates their maturation to erythrocytes. This book includes chapters on: 1. The physiology and pathophysiology of erythropoietin formation; effects on erythropoiesis. 2. Structural and biological characteristics of r-HuEPO. 3. Pharmacology and erythropoietin. 4. Clinical use of r-HuEPO. 5. Selected undesired effects of r-HuEPO. 6. Dosage and recommendations for the administration of r-HuEPO.

Pfitzinger, P. (SIRC S-17658)

EPO: Illegal and deadly

(EPO: Illegal und tödlich)

Running Times, Boston(November 1998), 253; 16

Raynaud, E.; Fedou, C.; Solere, M.; Orsetti, A. (BISp 970927217)

Physiologie de l'épitéstostérone

(Physiologie des Epitestosterons/Physiology of epitestosterone)

Sci. et Sports, Paris 12 (1997), 1; 41-45

Epitestosterone is a naturally occurring endogenous epimer of testosterone, and a normal component of biological fluids of several species including man. In humans, epitestosterone does not originate from testosterone, and its production rate is only about 3% of that of testosterone. Epitestosterone is mainly secreted by the testis, from 5-androstene-3-beta,17alpha-diol as metabolic precursor, and by adrenal cortex from androstenedione. Epitestosterone is glucurono- and sulphoconjugated. It has been for a long time considered to be devoid of any physiological function. Further studies showed a complex antiandrogenic activity, consisting of competitive inhibition of testosterone conversion to dihydrotestosterone, antigonadotropic effect and also inhibition of 17alpha-hydroxylation and C19-20 desmolase, in rat, mice as well as human tissues. Reference values for urine and plasma are given. Determination of the urinary excretion ratio of testosterone to epitestosterone glucuronides is used to detect testosterone administration in athletes, with a threshold value of 6. Some cases of physiologically high ratios, and analysis of the sulphate fraction as a possible explanation, are discussed. In conclusion, optimal markers of exogenous testosterone administration are described, such as urinary ratio of testosterone glucuronide to luteinizing hormone, plasma ratio of testosterone to 17alpha-hydroxyprogesterone, and a dynamic endocrine test using ketoconazole.

Rentic, S. (BISp 980531893)

Human recombinant erythropoietin (rhEPO) – physiology and biochemistry

(Menschliches rekombinantes Erythropoietin (rhEPO) – Physiologie und Biochemie)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 191-208, ISBN 3-89001-016-4

Erythropoietin (EPO) is a glycoprotein hormone which is required for maintenance, proliferation and differentiation of the stem cells that produce erythrocytes. It is a member of cytokine family, a group of proteins involved in regulation of cell growth and differentiation. As with other cytokines, the activity of EPO is mediated by formation of extracellular complexes, which results in the transmission of a signal to the interior of the cell. In the case of EPO the level of the circulatory erythrocytes is regulated by stimulating the maturation of late erythroid progenitor cells into proerythroblasts. By this mechanism the hormone stimulates production of red blood cells. Administration of EPO increases reticulocyte counts, haemoglobin levels (from 15 to 54%) and haematocrit (from 17 to 60%) in a dose-proportional manner after intravenous administration. Interestingly, hematocrit (HCT) increased more rapidly after s.c. administration compared to patients who received EPO intravenously, and may last about two to six weeks. It has been reported that natural level of serum EPO increased after exercise but the mean hematocrit values were not changed significantly. Administration of EPO is associated with a significant decrease in serum ferritin (by 74%) which might be reversed with i.v. iron supplementation.

Rich, J.D.; Dickinson, B.P.; Flanigan, T.P.; Valone, S.E. (BISp 990338443)

Abscess related to anabolic-androgenic steroid injection

(Durch Injektion anabol-androgener Steroide verursachter Abszeß)

Med. & Sci. in Sports & Exerc., Madison (Wisc.) 31 (1999), 2; 207-209

One million individuals in the United States, predominantly males under 25 yr of age, are current or past users of anabolic-androgenic steroids. Fifty percent of these young adults administer their drugs intramuscularly, placing them at risk for infections related to injection. The authors present a case report of an injection-related thigh abscess in a 26-yr-old anabolic steroid injector who did not use sterile injection technique and reported sharing multidosage vials with two other weightlifting colleagues. Reported infections associated with anabolic-androgenic steroid injection include abscesses attributable to *Mycobacterium smegmatis*, *Staphylococcus*, *Streptococcus*, and *Pseudomonas* organisms as well as HIV, hepatitis B, and hepatitis C. These infections are primarily related to non-sterile injection technique, shared injection equipment, and are avoidable with appropriate prevention techniques. Education is needed to prevent infectious complications such as abscesses and blood-borne pathogens among anabolic-androgenic steroid injectors.

Roberts, D.B. (SIRC 456575)

Erythropoietin production as a physiological response to intense exercise

(Erythropoietin-Produktion als eine physiologische Reaktion auf intensive körperliche Belastung)

University Microfilms International, Ann Arbor (Mich.), 1997, 3 microfiches

Rossi, R.; Gambelunghe, C.; Parisse, I.; Lepri, E.; Rufini, S. (BISp 981034970)

Eritropoietina e doping

(Erythropoietin and doping/Erythropoietin und Doping)

Med. dello Sport, Turin 51 (1998), 2; 191-195

Erythropoietin (EPO) is a glycoprotein growth factor which functions as a classic endocrine hormone. It is produced in the kidney in response to reduced oxygen availability. It then

circulates through the body stream to act on erythroid marrow cells, regulating the rate of erythropoiesis. Its production is both inducible and constitutive, with tissue hypoxia providing the signal for gene transcription. EPO directs erythropoiesis through the interaction of the hormone with specific receptors on the surface of erythroid precursor cells. Sports literature reports widespread doping with erythropoietin. Evidence of abuse is manifold but circumstantial and includes, for example, the spate of mysterious deaths of competitive Dutch and Belgian cyclists between 1987 and 1990. Endurance athletes have long sought ways of increasing their hemoglobin levels. These have included physiological methods such as training at high altitudes and illegal and dangerous methods such as blood transfusions and, more recently, EPO abuse. For athletes abusing erythropoietin the rise, in exercising blood pressure, together with the rise in hematocrit and blood viscosity, has obvious and severe implications. Among possible solutions to measure EPO levels in an athlete's biological fluids, the most simple method is a specific serum immunoassay with monoclonal antibody to EPO (ELISA).

Schänzer, W. (BISp 970423819)

**Aktuelle Probleme und Tendenzen im Doping
(Current problems and tendencies in doping)**

Leistungssport, Münster 27 (1997), 2; 4-11. Also as unpublished translation, South Australian Sports Institute, Adelaide (1997), 1-10 (SIRC 452276)

Unter Doping wird – in Anlehnung an die Definition der Medizinischen Kommission des IOC – die Verwendung von Substanzen aus den verbotenen Wirkstoffgruppen der Stimulantien, Narkotika, anabolen Wirkstoffe, Diuretika und Peptidhormone und Analoge sowie die Anwendung verbotener Methoden wie dem Blutdoping und pharmakologischer, chemischer und physikalischer Manipulationen verstanden. Darüber hinaus sind Wirkstoffgruppen mit gewissen Einschränkungen zugelassen. Dieser Beitrag vermittelt einen allgemeinen Überblick über aktuelle Probleme und Tendenzen im Doping.

According to the definition of the Medical Commission of the IOC doping is understood as the use of substances from the banned drug groups of stimulants, narcotics, anabolic drugs, diuretics and peptid hormones as well as analogues. The use of forbidden methods such as blood doping as well as pharmacological, chemical and physical manipulations is also defined as doping. Certain groups of drugs are only admitted with certain restrictions. This article gives a general overview of current problems and trends in doping.

Schänzer, W.; Geyer, H.; Sigmund, G. (BISp 980531880)

**Excretion studies with dextropropoxyphene
(Studien zur Ausscheidung von Dextropropoxyphen)**

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 305-310, ISBN 3-89001-016-4

As the IOC has cancelled dextropropoxyphene from the list of banned substances this opioid analgesic can be used for therapeutic reasons without causing any problem in doping control as it has been in the past, based on the long elimination half-life mainly of nordextropropoxyphene. As dextropropoxyphene and its metabolite are detectable in the screening procedure for stimulants the medical use of dextropropoxyphene can be monitored.

Schamasch, P. (BISp 990639938)

**EPO and PFCs
(EPO und PFCs)**

Olymp. Rev., Lausanne 26 (August/September 1998), 22; 8

Like EPO (erythropoietin) PFCs (perfluorocarbons) are oxygen transporters. PFCs have the ability to dissolve, transport and release large quantities of oxygen in the body. This action, which is very useful in medicine, is exploited in sport to artificially enrich tissues with O₂.

Schulz, Th.; Smolnikar, K.; Diel, P.; Michna, H. (BISp 981135457)

Gendoping im Sport: Fakt oder Fiktion

(Gene doping in sport: Fact or fiction)

Forsch. Innovat. Technol., Cologne (1998), 1; 13-18

Verf. stellen die theoretische und nach eingehender Forschung realisierbare Möglichkeit einer neuen Form des Leistungsdopings vor. Ausgehend von den Grundlagen der Genetik beschreiben sie Methoden der Gentherapie und wie diese für den Sport relevant werden könnten. Was zunächst zur gezielten Muskelhypertrophie bei Zuchttieren geführt hat, läßt sich in spekulativer Sicht auch am Mensch durchführen. Exemplarisch zeigen Verf. auf, wie die Gentechnologie im medizinischen Bereich Heilungschancen vor allem bei Krebserkrankungen verbessern kann. Im Vordergrund der gentechnischen Untersuchungen für den Leistungssport steht das Myostatin-Gen, welchem eine bedeutende Funktion für die Regulation des Muskelwachstums zugesprochen wird. Daneben werden noch andere Möglichkeiten des Gendopings aufgeführt. Die Schwierigkeit ihrer Nachweisbarkeit wird erläutert und unterstrichen.

The authors present a new possibility of doping in high-performance sport: so-called gene doping. The main focus of research in this area is on the myostatin gene, which has an important function for the regulation of muscle growth. The difficulty of the verification of gene doping is emphasised.

Schwarz, D. (BISp 980431065)

Der Einfluß von anabolen Steroiden auf den Fettstoffwechsel und ausgewählte Gerinnungsparameter – eine Längsschnittstudie

(The influence of anabolic steroids on the fat metabolism and selected coagulation parameters – a longitudinal study)

Freiburg i. Br.: Univ., 1997. Diss., 58 pp.

Es liegen Befragungen und Statistiken vor, die den aktuellen Konsum an AS in Industrienationen in die quantitative Dimension von anderem Drogenmißbrauch rücken. Vor diesem Hintergrund lassen sich die Resultate aus dieser Studie wie folgt zusammenfassen. Es ergibt sich bei dem Mißbrauch von anabolen Steroiden ein pathologisch verändertes Lipoproteinprofil, daß sich auch nach Absetzen in drei- bis fünfmonatigem Abstand nicht normalisiert. Diese Veränderungen spielen sich vor allem im Bereich der HDL-Subfraktionen ab, wobei die Subfraktion, der die größte Antiatherogenität zugeordnet wird (HDL2b), den stärksten Veränderungen unterworfen ist. Nicht nachgewiesen werden konnte eine Veränderung innerhalb der LDL, womit auch keine signifikante Abnahme der LDL nach Absetzen vorliegt. Auch nach mehrmonatiger Pause muß man von einem atherogenen Lipoproteinprofil ausgehen, welches sich nach Wiederaufnahme eines AS-Mißbrauches potenziert. Die Bodybuilder, die sich wissentlich AS selbst zuführen, setzen sich somit einem dauernden, mehrfachen Risiko, an einer Arteriosklerose zu erkranken, aus. Als Weiteres ergab sich aus den Ergebnissen der Gerinnungsuntersuchungen der Hinweis auf ein Überwiegen prokoagulatorischer Faktoren, die jedoch im einzelnen weiter untersucht werden müssen. Es konnte nicht ermittelt werden, ob hierfür die AS direkt oder das veränderte Lipoproteinprofil verantwortlich ist. Auch läßt sich nicht sicher eine akute Gefahr der Thromboseentstehung nachweisen. Trotzdem muß davon ausgegangen werden, daß zusätzlich zur Gefahr der

Arterioskleroseentstehung das Risiko eines thromboembolischen Ereignisses vorhanden ist. Somit ist in der Präventivmedizin und in der medizinischen Betreuung von Bodybuildern, Fitneßsportbegeisterten und Kraftsporttrainierten unbedingt über die zusätzlichen Risiken und auch langfristig anhaltenden pathologischen Veränderungen von männlichen Hormonen und deren Abkömmlingen aufzuklären.

The abuse of anabolic steroids leads to a pathologically changed lipoprotein profile . These changes mainly take place in the area of HDL subfractions. Athletes taking in anabolic steroids are therefore at a high risk to develop arteriosclerosis. Coagulation studies showed that there was also a predominance of procoagulating factors in athletes taking in anabolic steroids, which means that these athletes undergo the risk of suffering from thromboembolism, too.

Schweizer, C.; Cardis, C.; Saugy, M.; Rivier, L. (BISp 980531866)

Nicotine in sport: Use or abuse?

(Nikotin im Sport: Gebrauch oder Mißbrauch?)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 269-277, ISBN 3-89001-016-4

Small doses of nicotine produce a stimulation of the respiratory system and can increase the activity of the skeletal muscles. The answer of the body to nicotine is known to be very rapid and powerful. Although the absorption of this alkaloid by the classical way (smoking cigarettes) is contradictory with sport performance, non-official reports indicate that chewing special tobacco preparation (snus) is now the current practice of some athletes. The main effects expected by the users are the increase of alertness and the decrease of stress. Nicotine is a very toxic alkaloid and oral intake produces similar health problems as smoked nicotine. The distribution of nicotine users was established in the athlete population through a portion of the 2000 urines analysed in our laboratory for doping controls during 1996. Secondly, the route of administration of nicotine was tentatively determined by using metabolisation indicators. Results show that in team sports, mainly in ice hockey, football and basketball, the percentage of nicotine positive urines was higher than in other sports. Our laboratory still investigates this problem further in order to establish whether or not nicotine should be considered as a doping agent in sport. In that case, rules similar to caffeine, with a maximum urinary concentration or a specific ratio (nicotine to cotinine), could be applied.

Schwenk, T.L. (BISp 980330403)

Psychoactive drugs and athletic performance

(Psychopharmaka und sportliche Leistung)

Physician & Sports Med., Minneapolis (Minn.), 25 (1997), 1; 32-46

Some psychoactive drugs have actual performance-enhancing side effects. However, many actually decrease performance, primarily because of adverse cardiovascular effects and impaired judgement. Athletes and non-athletes alike may be knowingly or unknowingly exposed to psychoactive substances if they use over-the-counter, recreational, or prescription drugs. Many national and international sports federations ban or limit psychoactive drugs use. The physiologic actions of psychoactive drugs and their use by high school and college athletes are discussed here.

Sizoi, V.F.; Bolotov, S.L.; Semenov, V.A. (BISp 980531878)

Study of bromantane metabolites structure

(Untersuchung der Strukturen der Bromantan-Metaboliten)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 287-300,

ISBN 3-89001-016-4

This study represented the masking effect of bromantane in the steroid screening. Overdose of bromantane can confuse the interpretation of the analytical results. The interference is successfully eliminated by the extraction with n-pentane without the addition of potassium carbonate. Thus, the steroid profiles are unmasked.

Smith, K.S. (SIRC 457844)

Effects of ephedrine hydrochloride on maximal strength output when potentiated by acetylsalicylic acid (aspirin) and methylxanthine (caffeine)

(Auswirkungen von Ephedrin-Hydrochlorid auf die maximale Kraffleistung im Falle einer Potenzierung durch Acetylsalicylsäure (Aspirin) und Methylxanthin (Koffein))

University Microfilms International, Ann Arbor (Mich.), 1997, 1 microfiche (25 fr.)

Spielvogel, H.; Rodriguez, A.; Sempore, B.; Caceres, E.; Cottet-Emard, J.M.; Guillon, L.; Favier, R. (SIRC 420220)

Body fluid homeostasis and cardiovascular adjustments during submaximal exercise: Influence of chewing coca leaves

(Körperflüssigkeits-Homeostase und kardiovaskuläre Anpassungen während submaximaler Belastung: der Einfluß des Kauens von Kokablättern)

Europ. J. of appl. Physiol., Berlin 75 (May 1997), 5; 400-406

The present study was undertaken to determine the haematological and cardiovascular status, at rest and during prolonged (1 h) submaximal exercise (approximately 70 percent of peak oxygen uptake) in a group (n = 12) of chronic coca users after chewing approximately 50 g of coca leaves. The results were compared to those obtained in a group (n = 12) of non-chewers. At rest, coca chewing was accompanied by a significant increase in heart rate (from 60 (SEM 4) to 76 (SEM 3) beats/min), in haematocrit (from 53.2 (SEM 1.2) to 55.6 (SEM 1.1) percent) in haemoglobin concentration, and plasma noradrenaline concentration (from 2.8 (SEM 0.4) to 5.0 (SEM 0.5) $\mu\text{mol/l}$). It was calculated that coca chewing for 1 h resulted in a significant decrease in blood (-4.3 (SEM 2.2) percent) and plasma (-8.7 (SEM 1.2) percent) volume. During submaximal exercise, coca chewers displayed a significantly higher heart rate and mean arterial blood pressure. The exercise-induced haemoconcentration was blunted in coca chewers compared to non-chewers. It was concluded that the coca-induced fluid shift observed at rest in these coca chewers was not cumulative with that of exercise, and that the hypovolaemia induced by coca chewing at rest compromised circulatory adjustments during exercise.

Stricker, P.R. (SIRC 463500)

Other ergogenic agents

(Weitere ergogene Substanzen)

Clin. in Sports Med., Philadelphia 17 (April 1998), 2; 283-297

The quest for athletic perfection continues to promote the production of so-called ergogenic aids. This article reviews some of the most popular compounds, their benefits and pitfalls, and cautions against accepting the often unproven claims made by the producers of such supplements. It is stressed that insufficient testing and yet unknown long-term effects are of major concern. The author points out that although certain legal supplements may actually be of added benefit to some athletes, true athletic success continues to stem primarily from genetic endowment, hard work, dedicated training, and proper nutrition.

Sturmi, J.E.; Diorio, D.J. (BISp 980532196)

Anabolic agents

(Anabolika)

Clin. in Sports Med., Philadelphia (Penn.) 17 (1998), 2; 261-282

This article provides a comprehensive but practical discussion of four anabolic agents used by athletes. Anabolic-androgenic steroids, dehydroepiandrosterone, human growth hormone, and insulin-like growth factor are discussed. A thorough review of available literature on the basic chemistry and physiology, epidemiology, reasons for use, and performance and side effects of each agent are also presented.

Swain, R.A.; Harsha, D.M.; Baenziger, J.; Saywell, R.M. (BISp 971027895)

Do pseudoephedrine or phenylpropanolamine improve maximum oxygen uptake and time to exhaustion?

(Verbessern Pseudoephedrin und Phenylpropanolamin die maximale Sauerstoffaufnahme und die Ausdauerleistung?)

Clin. J. of Sport Med., New York 7 (1997), 3; 168-173

Objective: To study the effects of over-the-counter dosages of the pure alpha-agonists pseudo-ephedrine (PSE) and phenylpropanolamine (PPA) on selected parameters of exercise performance, and to establish a range of corresponding drug levels in the urine of the athletes who use these drugs. **Design:** Placebo-controlled, randomized, double-blinded, multiple-dose trial. **Participants:** A convenience sample of 20 male cyclists, aged 18-35, from the local cycling community. Inclusion criteria required cycling at least 50 miles a week, no chronic medical problems, and not taking any medications. Subjects were recruited by local ads and word of mouth. **Intervention:** Patients were randomized to one of two groups of 10 subjects. Each subject in both groups performed three separate bicycle ergometer tests after ingestion of varying dosages of alpha-agonists. One group performed tests after receiving placebo, 0.33 mg/kg PPA, and 0.66 mg/kg PPA, whereas the other group received placebo, 1 mg/kg PSE, and 2 mg/kg PSE. A minimum 1-week washout period was required between tests. Urine for drug testing was collected 1 h before, immediately afterward, and the next morning after testing. Drug testing was performed by gas GC/MCD at a facility approved by the International Olympic Committee. **Main outcome measures:** Maximum oxygen uptake (VO₂max), time to exhaustion, urine drug levels of PSE and PPA, peak blood pressures (BPs), peak pulse, and Borg scale (rating of perceived exertion or RPE). **Conclusions:** The authors found no significant differences between trials in maximum oxygen uptake (VO₂max), peak or progression of Borg Scale (RPE), maximum systolic and diastolic BPs, peak pulse, or time to exhaustion among the athletes tested at the dosages studied. Urine drug levels in athletes taking one and two times the over-the-counter dosages of PPA and PSE in all cases exceeded allowable limits according to International Olympic Committee drug-testing standards.

Ueki, M.; Ikekita, A.; Okano, M.; Hiruma, T. (BISp 980531875)

Bromantane: Japanese experience

(Bromantan: Erfahrungen aus Japan)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 279-286, ISBN 3-89001-016-4

Since 1994 several steroid test samples have been invalidated by the IOC laboratories in Montreal, Lausanne, Huddinge and Tokyo because of the presence of unknown undeclared agents. The identification of this bromine containing compounds was made by Ayotte in the middle of 1996 in cooperation with the International Amateur Athletic Federation. The compound, bromantane, is a adamantane derivative that has the parabromaniline side chain, and was developed in Russia as immuno-stimulator. In

Russia it has been used as an unauthorized medicine with soldiers and athletes. Later at the centennial Olympics in Atlanta, nine bromantane cases were found but because of legal problems the findings did not lead to disqualification. This paper refers to a positive case of bromantane. The results demonstrate that an overdose of bromantane could manipulate the urinary steroid profiles. It is not just an interference and co-elution but a manipulation of the chromatographic behavior of the steroids. A simple extraction procedure to eliminate the influence of bromantane on the steroid profiles is described.

Wang, C. (SIRC 462206)

(Effect of high-altitude training on EPO in swimmers)

(Auswirkungen von Höhenttraining auf EPO bei Schwimmern)

Sports Sci. Res., Shanghai 18 (1997), 2; 20-23

This article studies the effect of high-altitude training on EPO and Hb in athletes' blood. The results of this study indicate that the level of EPO will rise under the conditions of oxygen deficit at high-altitude, intensity of training and quick change of environment, but this just can be maintained for a short time, generally less than one week. Therefore these changing regulation can be used for arranging the intensity of training at high altitude.

Wiley, J.W. (SIRC 422285)

Insulin as an anabolic aid? A danger for strength athletes

(Insulin als Anabolikum? Eine Gefahr für Kraftsportler)

Physician & Sports Med., New York 25 (October 1997), 10; 103-104

Williams, M.H. (SIRC 421126)

The ergogenics edge: Pushing the limits of sports performance

(Der entscheidende Vorteil durch leistungssteigernde Hilfen: Wie man die Grenzen der sportlichen Leistung hinausschiebt)

Champaign (Ill.): Human Kinetics, 1998. ix, 317 pp. , ISBN 0-88011-545-9

Contents: (1) Factors limiting sports performance; (2) Breaking performance barriers with sports ergogenics; (3) Boosting energy and power; (4) Building mental toughness; (5) Getting a mechanical advantage; (6) Examining performance factors in specific sports; (7) Answering four big questions about ergogenics; (8) Rating the sports ergogenics. Appendix A: Guide to prohibited substances and methods; Appendix B: Approximate equivalences of selected United States and SI weights and measures.

Williams, M.H.; Kreider, R.B.; Branch, D.J. (BISp)

Creatine. The power supplement

(Kreatin: die Power-Substanz)

Champaign (Ill.): Human Kinetics, 1999. 120 pp, ISBN 0-7360-0162-X

In an effort to improve performance, more and more athletes are using creatine supplementation as a method to maximise the effect of regular training. But what are the clinical effects of this dietary supplement and does it really work? The subject of numerous studies during the 1990s, creatine is a naturally occurring substance necessary for synthesising phosphocreatine that is used by the muscles during high-intensity exercise. This book offers a detailed exploration of the following: 1. Scientific literature regarding the effects of creatine supplementation on various forms of exercise, sport performance and body mass. 2. Creatine requirements and metabolic functions. 3. Supplementation protocols and the effects on muscle creatine stores. 4. Recommendations for use. 5. Possible adverse effects of creatine supplementation. 6. Legal and ethical considerations regarding creatine use by competitive athletes. 7. The historical evolution of the use of

creatine.

Wroblewska, A.M. (SIRC 450517)

**Androgenic-anabolic steroids and body dysmorphia in young men
(Androgen-anabole Steroide und Körper-Dysmorphie bei jungen Männern)**

J. of psychosom. Res., Kidlington (England) 42 (March 1997), 3; 225-234

Wu, F.C. (SIRC 453141)

**Endocrine aspects of anabolic steroids
(Endokrinologische Aspekte anaboler Steroide)**

Clin. Chem., Washington 43 (July 1997), 7; 1289-1292

Yang, S.M.; Wang, X.B.; Fang, Z.L.; Wang, S.; Qin, Y.; Yi, M.Q.; Gao, H.; Xu, B.H.; Zhou, L.L.; Zeng, F.X.; Guo, J.J.; Yang, Z.Y.; Deng, J.; Xie, M.H.; Zhang, C.J. (BISp 980531845)

Observation on hematology and biochemistry of six Chinese following rhEPO administration

(Hämatologische und biochemische Beobachtung von sechs Chinesen nach Verabreichung von rekombinantem menschlichem Erythropoietin)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 215-221, ISBN 3-89001-016-4

Six male volunteers (age 19 to 23) were subcutaneously administered rhEPO at a dosage of 30 IU/kg bwt, three times a week for 4 weeks. The observation was made on 6 hematological (RBC, HGB, HCT, MCV, MCH and MCHC) and 2 biochemical indices (Epo, TfR) following the administration. Compared with 4 individuals in control group (age 19 to 23) RBC, HGB and HCT were elevated by the injection (4.65 ± 0.33 vs 5.07 ± 0.38 t/l, 134.50 ± 8.2 vs 150.10 ± 10.1 g/l, $41.76 \pm 1.93\%$ vs $46.42 \pm 2.83\%$; $P < 0.05$). The serum concentrations of TfR and EPO were found significantly increased following the multiple injections of rhEPO (3.42 ± 0.60 ug/ml vs 4.56 ± 0.88 ug/ml, 9.96 ± 8.30 mIU/ml vs 19.94 ± 10.50 mIU/ml; $P < 0.05$).

Yesalis, Ch.; Cowart, V. (BISp 990640014)

**The steroids game. An expert's inside look at anabolic steroid use in sports
(Das Steroid-Spiel. Der Insider-Blick eines Experten auf die Verwendung anaboler Steroide im Sport)**

Champaign (Ill.): Human Kinetics, 1998. 216 pp, ISBN 0-88011-494-0

This book offers solid facts and expert commentary on a drug problem that has filtered its way into every level of competitive sport. The authors provide a straightforward and balanced discussion of what steroids are, how they work, their effects on athletic performance and their health consequences. This book explores the history of drug testing and how steroid uses have been able to stay one step ahead of authorities trying to crack down on steroids. The book also examines educational programmes that are successfully combating steroid use, legal issues relating to steroid use and abuse and effective treatment programmes for those addicted to steroids.

2 Publikationen zur Dopingkontrolle / Publications dealing with doping control

Ambrose, P.J. (SIRC 453137)

**Doping control in sports – a perspective from the 1996 Olympic Games
(Dopingkontrolle im Sport – eine Perspektive auf Basis der Olympischen Spiele)**

1996)

Amer. J. of Health System Pharmacy, Bethesda (Md.) 54 (1 May 1997), 9; 1053-1057

Ayotte, C. (SIRC 456306)

Evaluation of elevated testosterone/epitestosterone values in athlete's urine samples

(Evaluation erhöhter Testosteron/Epitestosteronwerte in Urinproben von Sportlern)

New Stud. in Athletics, Monaco 12 (September 1997), 2/3; 87-94

The use of prohibited substances by athletes has been controlled for nearly thirty years, mainly by conducting tests on urine samples provided in-competition or out-of-competition. The athlete found guilty of a doping offence has the right to appeal the decision through administrative procedures. Whenever an adverse finding is litigated, all aspects of the testing are challenged including in numerous instances, the scientific basis of the test no matter whether the substance is purely synthetic or can normally be found in the body fluids. One of the duties of the IAAF Doping Commission is to evaluate the reported positive finding and to recommend action. In this paper it is described on which scientific ground a testosterone positive finding can be judged.

Bahr, R.; Tjoernhom, M. (BISp 980531718)

Prevalence of doping in sports: Doping control in Norway, 1977-1995

(Häufigkeit des Dopings im Sport: Dopingkontrolle in Norwegen, 1977-1995)

Clin. J. of Sport Med., New York 8 (1998), 1; 32-37

Objective: To examine the results from doping controls conducted by the Norwegian Confederation of Sport (NCS) from 1977 to 1995. Methods: Data were collected by combining three computerized databases and manual records on samples taken and results from analyses in the International Olympic Committee (IOC)-accredited laboratories in London, Huddinge, Cologne, and Oslo. Samples were declared positive if they contained any banned substance on the IOC list that was in effect at any given time. Results: A total of 15,208 samples were taken; most of them (12,870; 85%) were from Norwegian athletes (90% unannounced tests) belonging to national federations under NCS jurisdiction (NCS members), 461 (3%) were from external Norwegian athletes (either users of private gyms or athletes in organized sports federations not affiliated with the (NCS), and 1,874 (12%) were from foreign athletes (three cases with unknown affiliation). There were 130 positive samples and 24 refusals among NCS members (1.2%; men, 1.4%; women, 0.3%), 86 positive samples and 8 refusals among external Norwegian athletes (20%; men, 24%; women, 8%), and 39 positive samples and 1 refusal among foreign athletes (1.6%; men, 2.1%; women, 0.7%). A gradual decrease in the percentage of positive samples was observed among NCS members as testing frequency was increased gradually from 1987 to 1995 in the three high-prevalence sports: powerlifting, weightlifting, and athletics. Conclusion: An increase in the test frequency of doping tests was associated with a decrease in the percentage of positive samples in targeted sports.

Birkeland, K.I.; Donike, M.; Ljungqvist, A.; Fagerhol, M.; Jensen, J.; Hemmersbach, P.; Oftebro, H.; Haug, E. (BISp 970222900)

Blood sampling in doping control – first experiences from regular testing in athletics

(Blutprobenentnahme im Rahmen von Dopingkontrollen – erste Erfahrungen mit regelmäßigen Dopingtests in der Leichtathletik)

Int. J. of Sports Med., Stuttgart 18 (1997), 1; 8-12

The authors report the results from blood sampling taken for the first time during doping

control in athletics. The study includes samples from 99 athletes tested during IAAF-meetings in 1993-94. Blood doping with allogenic blood was not detected. The distribution of haemoglobin levels in athletes did not differ markedly from that found in controls. Erythropoietin (EPO) values were markedly lower in athletes than in controls, and 58% had EPO lower than the detection limit for the assay. This may be due to high-altitude residence prior to testing. Measurements of growth hormone (GH) and insulin-like growth factor 1 did not suggest GH-misuse in any athlete tested. One third of the male athletes had testosterone levels that were lower than the normal reference interval. This may at least partly be due to the combination of sampling at night and after strenuous exercise. One female athlete was found to have a grossly elevated testosterone level. In conclusion, the present results show the importance of taking into account the special circumstances during sampling when interpreting results from blood testing in athletes. Future research should focus on developing more sensitive and specific tests to detect doping with endogenous substances such as GH and EPO.

Boer, D. de; Graaf, M.L.D. de; Goerter, P.; Maes, R.A.A. (BISp 980531863)

The implementation of the detection of the abuse of 3,4-methylenedioxymethamphetamine and analogues in doping control screening procedures

(Umsetzung des Nachweises von 3,4-Methylenedioxymethamphetamin und analoger Substanzen im Rahmen von Dopingkontroll-Screeningtests)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 249-258, ISBN 3-89001-016-4

In Europe the abuse of amphetamine designer drugs is an increasing problem in the field of Drug-Of-Abuse (DOA). It is a problem which does not only affect the society in general but also sports in particular. Athletes may use amphetamine designer drugs not only to improve their sport performance but also for recreational reasons. Therefore it would be of interest to implement the detection of the abuse of these designer drugs in doping control screening procedures. Conclusions: 1. Besides the parent compounds several kinds of metabolites can be found in urine after the abuse of 3,4-methylenedioxymethamphetamine and analogues. 2. Depending of the procedure the detection should be focussed on certain metabolites. 3. Current commercial immunoassays are only specific for those metabolites, which still have their amine function, except those which also have both the 3-methoxy and 4-hydroxy substituent.

Boer, D. de; Hoeld, K.M.; Crouch, D.J.; Wilkins, D.G.; Rollins, D.E.; Maes, R.A.A. (BISp 980531827)

The potential use of hair in doping control in general and in the detection of stanozolol in particular

(Der potentielle Nutzen der Haaranalyse für die Dopingkontrolle allgemein und im besonderen für den Nachweis von Stanozolol)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 41-47, ISBN 3-89001-016-4

The use of hair as biological specimen for Drugs-Of-Abuse (DOA) testing has been well established. Numerous scientific articles regarding this subject are still being published. A major advantage of using hair specimen for analysis is the long detection window in hair. As one objective in doping analysis is to increase the length of a detection window of particular doping agents, hair analysis may be of interest. So far the greatest improvements regarding detection windows in doping analysis have been achieved by introducing more sophisticated analytical techniques. This report describes the potential of using hair as biological specimen in doping control.

Bowers, L.D. (BISp 980532198)

**Athletic drug testing
(Drogennachweis bei Sportlern)**

Clin. in Sports Med., Philadelphia (Penn.) 17 (1998), 2; 299-318

A drug-control program requires testing to ensure compliance and to deter use. In the athletic drug testing area, measurement of performance-enhancing substances is complex partly because of the large number of prohibited substances. A number of sophisticated analytical techniques, such as high-resolution mass spectrometry, are increasingly used to provide the maximum detection time window. Endogenous steroids pose an increasing challenge because of their availability in "nutritional supplements." Continued vigilance is required to prevent the pharmacologic enhancement of performance.

Bowers, L.D. (SIRC 453145)

**Analytical advances in detection of performance-enhancing compounds
(Analytische Fortschritte beim Nachweis von leistungssteigernden
Zusammensetzungen)**

Clin. Chem., Washington 43 (July 1997), 7; 1299-1304

Breidbach, A.; Schänzer, W. (BISp 980531844)

**Fast and accurate determination of urinary human erythropoietin with Nichols
Institute Diagnostics chemiluminescence immunoassay for erythropoietin after
gelfiltration**

**(Schnelle und präzise Bestimmung des menschlichen Erythropoietins im Urin mit
Hilfe des NID-Chemilumineszenz-Immunoassays für Erythropoietin nach
Gelfiltration)**

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 209-214, ISBN 3-89001-016-4

As in routine doping control the volume of a urine sample is limited and high numbers of samples have to be tested within a limited period of time, a method for the determination of urinary EPO has to be fast and use only a small volume of urine. Here we present a fast and accurate method for the direct determination of EPO in urine using gelfiltration as a clean-up step with 2,0 mL of urine and a cycle time for one sample of ca. 5 min. NID's chemiluminometric immunoassay is used for quantification with an incubation time of 15 h. This method is not only interesting for the detection of EPO misuse but also for the determination of excreted EPO in pharmacological studies.

Bressolle, F.; Audran, M.; Gareau, R.; Baynes, R.D.; Guidicelli, C.; Gomeni, R. (SIRC 481857)

**Population pharmacodynamics for monitoring epoetin in athletes
(Populations-Pharmakodynamik zur Kontrolle von Epoetin bei Sportlern)**

Clin. Drug Invest., Auckland 14 (1997), 3; 233-242

Brisson, G.R.; Gutierrez Sainz, A.; Ayotte, C.; Gareau, R.; Senecal, L.; Castillo, M.J. (BISp 970323728)

**Frequent serum sampling in healthy men discloses testosterone peaks exacerbated
by testosterone propionate administration**

**(Häufige Blutentnahmen in kurzen Zeitabständen decken bei gesunden Männern
Testosteron-Peaks auf, die durch Zufuhr von Testosteronpropionat noch verstärkt
werden)**

Can. J. of appl. Physiol., Champaign (Ill.), 22 (1997), 1; 58-65

Interval samplings uncover blood diurnal oscillations for several hormones, highlighting the importance of short time intervals in the disclosure of subtle pulsatile patterns of some peptide hormones, namely LH. In a study designed to develop new probes against steroid misuse, venous blood was sampled at 5-min intervals for 4 hours from 12 eugonadal adult male athletes, 6 receiving transcutaneous administrations of testosterone propionate and 6 placebo subjects. Brief supraphysiologic serum testosterone peaks were disclosed, the amplitude and frequency of these peaks being larger for the treated group. No solid explanation could be given to explain these bursts. Neither the binding/dissociation kinetics of SHBG molecules with and without increased circulating level of dihydrotestosterone, nor brief testosterone-inducing LH bursts, nor increased Leydig cell release could be invoked to explain these peaks. Their occurrence, although relatively rare, could represent a threat and lead to improper treatment.

Catlin, D.H.; Hatton, C.K. (SIRC 453140)

Issues in detecting abuse of xenobiotic anabolic steroids and testosterone by analysis of athletes' urine

(Aspekte des Nachweises des Mißbrauchs xenobiotischer anaboler Steroide und von Testosteron im Rahmen der Urinanalyse bei Sportlern)

Clin. Chem., Washington 43 (July 1997), 7; 1280-1288

Chrostowski, K.; Grucza, R. (BISp 980531852)

Diagnostic validity of HDL-C, CK and LH measured in blood serum for discrimination of AAS users during "on" and "off" cycle in body builders

(Diagnostischer Aussagekraft der Serumwerte von HDL-C, CPK und LH für die Erkennung von Konsumenten anaboler Steroide (Bodybuilder) in der Phase mit und ohne Medikamenteneinnahme)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 223-229, ISBN 3-89001-016-4

In prevention action against AAS use by sportsmen exercising in local clubs the Sport Medicine Outpatients Clinic of the Institute of Sport offered to a group of anonymous body builders a free medical examination and full information about their state of health and about the negative consequences of AAS application. The subjects, using voluntarily AAS, trained for themselves and were not body building competitors. They were informed on potential adverse effects of AAS on their health and informed consent was obtained from all of the subjects. The study, without any involvement of drug application to the subjects, was approved by the Ethical Commission of the Institute of Sport. The aim of the present study was to estimate the diagnostic validity of high density lipoprotein-cholesterol, creatinine kinase and luteinizing hormone measured in blood serum, in 17 body builders currently taking AAS (on cycle) and in 13 body builders who stopped using the AAS (off cycle). Result: The analysis of the three tests considered together gave some advantage by high sensitivity (94%). However, the specificity in this case was relatively low (54%). It seems that the three tests should be assessed as a first step for screening of AAS abuse.

Cohen, R.W. (SIRC 416874)

Doping control in the '96 Olympics

(Dopingkontrolle bei den Olympischen Spielen 1996)

J. of the med. Assoc. of Georgia, Atlanta (Ga.) 86 (January 1997), 1; 33-36

Dal Monte, A. (SIRC 481732)

Prospettive ed evoluzione futura dei controlli antidoping nello sport

(Zukunftsperspektiven und die Entwicklung der Dopingkontrollen im Sport/Future prospects and the development of doping controls in sport)

Atleticastudi, Rome 28 (May/June 1997), 3; 22-23

De Boer, D.; Seppenwoolde-Waasdorp, T.J.A.; Maes, R.A.A. (SIRC 461448)
Analytische technieken ingezet bij doping in sport
(Analysetechniken im Rahmen des Dopingsnachweises im Sport/Analytical techniques for doping detection in sports)
Pharmaceutisch Weekblad, Gravenhage (Netherlands) 132 (1997), 36; 1373-1387

Delbeke, F.T.; Eenoo, P. van; Backer, P. de (BISp 980632380)
Detection of human chorion gonadotrophin misuse in sports
(Nachweis des Mißbrauchs von menschlichem Choriongonadotropin im Sport)
Int. J. of Sports Med., Stuttgart 19 (1998), 4; 287-290

The peptide hormone human chorionic gonadotrophin (hCG) was measured in the urine of 5663 male athletes collected for doping analysis in Flanders during the period 1993-1996. Using the Abbott IMx hCG procedure, the free and whole molecule associated beta-subunit of human chorionic gonadotrophin was determined. Statistical evaluation of the data results in a far outside value of 2.28 mIU/ml. The decision limit, i.e. the concentration at which a sportsman will be considered positive, is set at 5mIU/ml to ensure with the greatest possible degree of certainty that no false positive results are reported.

Drut, G. (SIRC 410780)
Prevention et lutte contre le dopage
(Prävention und Dopingtests/Prevention and dope test)
Educ. phys. et Sport, Paris 47 (January/February 1997), 263; 40

Ferstle, J. (SIRC 414090)
EPO testing provides glimpse of possible new drug testing protocols: Blood testing remains controversial
(EPO-Tests lassen neue Doping-Testprotokolle erkennen: Bluttests bleiben kontrovers)
Road Race Managem., Arlington (Va.)(March 1997), 177; 6

Geyer, H.; Berschick, P.; Marek-Engelke, U.; Schänzer, W. (BISp 980531879)
DNA typing for the confirmation of manipulation in dope control: A casework
(DNS-Typing zur Bestätigung von Manipulation in der Dopingkontrolle: Eine Fallstudie)
Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 301, ISBN 3-89001-016-4

In routine dope control a manipulation – six different athletes delivered identical urines – could be detected by the screening method for volatile nitrogen containing substances, by steroid profiling and by HPLC finger printing. The results were confirmed by PCR based analysis of urinary DNA with the two STR (short tandem repeat polymorphism) systems FGA (HUMFIBRA) and D18S51. This is the first documented case in dope control, where DNA typing was used to prove manipulation of urine samples. The advantage of the DNA typing is the possibility to individualize the urine samples by comparison of urine and blood results.

Geyer, H.; Schänzer, W.; Marek-Engelke, U.; Nolteernsting, E.; Opfermann, G. (BISp 980531835)
Screening procedure for anabolic steroids – the control of the hydrolysis with deuterated androsterone glucuronide and studies with direct hydrolysis

(Screening-Verfahren zum Nachweis anaboler Steroide – Kontrolle der Hydrolyse mit deuteriummarkiertem Androsteronglukuronid und Untersuchungen mit direkter Hydrolyse)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 99-101, ISBN 3-89001-016-4

For the deconjugation of steroid conjugates an enzymatic hydrolysis with beta-glucuronidase or beta-glucuronidase/arylsulfatase is performed. To control the hydrolysis step, [2,2,3,4,4-2H5]-androsterone glucuronide was synthesized. This deuterated glucuronide is used as an internal standard and together with the unconjugated internal standard [2,2,4,4-2H4]-etiocholanolone it allows a judgement of the completeness of the hydrolysis of steroid glucuronides. The control of the hydrolysis step makes enables direct hydrolysis of steroid conjugates without a previous solid phase extraction (e.g. by Amberlite XAD-2 polystyrene resin). In several studies disadvantages of the direct hydrolysis regarding the detection of low amounts of anabolic steroids or quantitation of endogenous steroids could not be found.

Gleixner, A.; Sauerwein, H.; Meyer, H.H.D. (BISp 970323182)

Nachweis von Clenbuterol in Kopfhair: Eine Methode zur Trainingsdopingkontrolle (Detection of Clenbuterol in human scalp hair: A method for doping control during training)

Dt. Z. f. Sportmed., Cologne 48 (1997), 2; 50-55

Mit Bekanntwerden der Anwendung von Clenbuterol zu Dopingzwecken, ist dieses Sympathomimetikum in die Schlagzeilen gerückt. In Blut oder Urin ist Clenbuterol nur kurze Zeit nach der Einnahme nachweisbar. Die vorliegende Untersuchung zielt darauf ab, den Nachweis der Einnahme von Clenbuterol mit Hilfe der Haaranalyse über einen längeren Zeitraum, als dies mit Urin oder Blut möglich ist, erbringen zu können. Kopfhairproben von 67 freiwilligen Probanden wurden mit einem Enzymimmuntest (EIA) und zur Bestätigung der positiven Befunde mit einer Kombination aus Hochleistungsflüssigkeitschromatographie (HPLC) und EIA auf Clenbuterolrückstände untersucht. Clenbuterol konnte in den Haaren von neun Probanden, die eine definierte Menge Clenbuterol zu therapeutischen Zwecken einnahmen, nachgewiesen werden. Die Konzentrationen lagen zwischen 25 und 160 ng Clenbuterol/g Haare. Die Anreicherung von Clenbuterol war in dunklen Haaren (150 ng/g) deutlich höher als in hellen Haaren (30 ng/g). Dies kennzeichnet den Einfluß der Haarfarbe auf die Höhe der Anreicherung von Clenbuterol in den Haaren. Clenbuterolrückstände konnten auch in Haarproben von sechs Probanden, die in der Vergangenheit unbekannte Mengen clenbuterolhaltigen Hustensafts einnahmen, gemessen werden. Die Konzentrationen lagen zwischen 3 und 8 ng/g. In Haarproben von zwei Bodybuildern konnten 50 und 92 ng/g nachgewiesen werden. Clenbuterol konnte aber nicht in Haarproben von 50 Probanden, die einen Querschnitt durch die lokale Bevölkerung repräsentierten, gemessen werden. Diese Ergebnisse zeigen, daß die Haaranalyse für Clenbuterol als Methode für Trainingskontrollen, im Rahmen des Sportdopings, geeignet ist.

The objective of this study was to detect the intake of the anabolic agent Clenbuterol via hair analysis beyond the time of measurable concentrations in blood and urine. Hair samples from 67 volunteers were analyzed for Clenbuterol residues by Enzyme Immunoassay (EIA) and by High Performance Liquid Chromatography (HPLC) and for confirmation of positive results by a combination of both methods (HPLC/EIA). Clenbuterol residues could be detected in hair from nine volunteers who took a known dosage of Clenbuterol for therapeutic purposes. The Clenbuterol concentrations varied from 25 to 160 ng/g hair. The accumulation of Clenbuterol was markedly higher in dark hair (150

ng/g) than in fair hair (30 ng/g), demonstrating the importance of hair pigmentation for the binding of Clenbuterol to the hair matrix. Clenbuterol residues could also be detected in hair from six volunteers who took a cough-mixture in an unknown regimen. These residues varied from 3 to 8 ng/g. In hair samples obtained from two bodybuilders of unknown anamnesis 50 to 92 ng Clenbuterol/g hair were measured. No Clenbuterol residues could be detected in hair samples from 50 volunteers representing a cross-section of the local population. The results show that hair analysis may serve as a powerful tool to detect and track the illegal use of Clenbuterol in sports doping.

Gräf, V.; Schiener, M. (SIRC 461452)

Bestimmung von Steroidhormonen in Kopfhaaren

(Determination of steroid hormones in head hair)

Z. f. Dermatol. und deren Grenzgebiete, Hessdorf (Germany) 183 (1997), 2; 89-90, 93-94

Horning, S.; Geyer, H.; Flenker, U.; Schänzer, W. (BISp 980531838)

Detection of exogenous steroids by $^{13}\text{C}/^{12}\text{C}$ analysis

(Nachweis exogener Steroide durch $^{13}\text{C}/^{12}\text{C}$ -Analyse)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 135-148, ISBN 3-89001-016-4

Urinary steroid profiles (steroid ratios) are used to control the misuse of endogenous steroids such as testosterone and dihydrotestosterone. For example, the testosterone/epitestosterone (T/E) ratio, measured by gas chromatography/mass spectrometry (GC/MS), is used to control testosterone administration. When the ratio lies outside the normal range ($T/E > 6$), the sample is positive (or a recommendation is made for a follow-up study). Similarly, dihydrotestosterone (DHT) misuse is controlled by comparing the ratios of the urinary excreted diols, 5 α -androstane-3 α ,17 β -diol (5 α AD) and 5 β -androstane-3 α ,17 β -diol (5 β AD). Recent investigations have illustrated the effectiveness of carbon isotope ratio mass spectrometry to detect and confirm testosterone administration. The method is based on comparison of the carbon isotope ratio ($^{13}\text{C}/^{12}\text{C}$) of testosterone to other endogenous steroids (testosterone precursors and metabolites). As exogenous (synthetic) testosterone has a lower ^{13}C abundance, measurement of the urinary testosterone carbon isotope ratio can be used to prove testosterone misuse. In fact, the carbon isotope ratios can be used to determine testosterone administration even when the T/E ratio is at its normal value ($T/E=1$). With support from the International Cycling Federation the authors have been able to continue their preliminary investigations with testosterone and have developed a method for confirming testosterone misuse based on carbon isotope ratio mass spectrometry. The method is based on carbon isotope ratio measurements of testosterone, testosterone metabolites, androsterone, etiocholanolone, 5 α AD and 5 β AD, and testosterone precursors, e.g., pregnanediol, pregnanetriol and cholesterol. In addition, the existing procedure was expanded to detect misuse of other endogenous steroids, including dihydrotestosterone (DHT) and dehydroepiandrosterone (DHEA).

Horning, S.; Schänzer, W.; Sample, B. (BISp 980531882)

HRMS analyses performed at the 1996 Summer Olympic Games

(HRMS-Analysen während der olympischen Sommerspiele 1996)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 329-337, ISBN 3-89001-016-4

Gas chromatography, high resolution mass spectrometry (GC/HRMS) using multiple ion detection (MID) via electric field scanning is an unmatched analytical method for trace level detection of anabolic steroids. In this article the use of HRMS at the 1996 Summer

Olympic Games is described. This includes (i) the installation of three Finnigan MAT 95S mass spectrometers at the SmithKline Beecham Clinical Laboratories in Atlanta, (ii) IOC accreditation of screening procedure IVb and HRMS related procedures prior to the Games and (iii) a report of the HRMS analyses performed during the Games.

Kicman, A.T.; Miell, J.P.; Teale, J.D.; Powrie, J.; Wood, P.J.; Laidler, P.; Milligan, P.J.; Cowan, D.A. (SIRC 461428)

Serum IGF-I and IGF binding proteins 2 and 3 as potential markers of doping with human GH

(Serum-IGF-I- und IGF-bindende Proteine 2 und 3 als potentielle Markersubstanzen bei Doping mit menschlichem Wachstumshormon)

Clin. Endocrin., Oxford 47 (1997), 1; 43-50

Lalljie, S.P.; Barroso, M.B.; Steenackers, D.; Alonso, R.M.; Jimenez, R.M.; Sandra, P. (SIRC 416675)

Micellar electrokinetic chromatography as a fast screening method for the determination of the doping agents furosemide and piretanide in urine

(Micellare elektrokinetische Chromatographie als eine schnelle Screening-Methode zur Bestimmung der Dopingsubstanzen Furosemid und Piretanid im Urin)

J. of Chromatogr. B: Biomedical Applications, Amsterdam 688 (10 January 1997), 1; 71-78

Layden, T. (SIRC 422941)

Paralysis by urinalysis: Mary Slaney's disputed drug test proves one thing: Track and field isn't making the grade

(Paralyse durch Urinanalyse: Mary Slaneys umstrittener Dopingtest beweist eines: Die Leichtathletik schafft es nicht)

Sports illustr., Los Angeles 86 (26 May 1997), 21; 108

Lombardo, J.A. (BISp 980532199)

Drug programs

(Drogenprogramme)

Clin. in Sports Med., Philadelphia (Penn.), 17 (1998), 2; 319-326

Drug use in athletic programs is a problem at all levels of competition from professional to middle school. To effectively and efficiently address this issue, a complete drug program is the best tool that organizations have at their disposal. This drug program, however, must be developed through the work of representatives of all who are involved in the organization. If the program is properly developed and enforced, the organization will have taken steps to address drug use among its members.

Mantell, M.E. (SIRC 457010)

Claims made for an EPO test breakthrough

(Ansprüche an einen Durchbruch in Sachen EPO-Test)

VeloNews, Boulder (Colo.) 27 (23 February 1998), 3; 16

Marek-Engelke, U.; Geyer, H.; Schänzer, W. (BISp 980531828)

The interpretation of female steroid profiles

(Die Interpretation von Steroidprofilen bei Frauen)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 51-70, ISBN 3-89001-016-4

Some characteristic parameters of the female urinary steroid profile, analysed for dope

control purposes, are very stable. The most stable steroid profile parameters for females are the ratios androsterone/etiocholanolone (A/E) and 5alpha-androstan-3alpha,17beta-diol/5beta-androstan-3alpha,17beta-diol (Adiol/Bdiol). The in male individual very stable ratio of testosterone/epitestosterone (T/epiT), often shows high variation as concentrations of these steroids are near the detection limit and often coeluting with other endogenous substances. These parameters can be influenced by the application of oral contraceptives and ethanol as well as bacterial activities in the urine. Pregnancy and special female diseases (adrenal syndrom, polycystic ovarian syndrom) often lead to characteristic steroid profile patterns and problems of analytical evaluation. For judging single urine samples or endocrinological studies it is important to take those factors into consideration.

Mottram, D.R. (BISp 990237108)

Banned drugs in sport – does the International Olympic Committee (IOC) list need updating?

(Verbotene Pharmaka im Sport – Muß die Dopingliste des IOC aktualisiert werden?)

Sports Med., Auckland 27 (1999), 1; 1-10

The International Olympic Committee (IOC) published the first list of doping classes in 1967. Since that time, there have been significant problems associated with doping control in sport. Sport is a high profile, internationally recognised activity. However, operational inconsistencies exist between countries and between sports federations. Endogenous substances, such as testosterone, human growth hormone (hGH) and erythropoietin (Epo) present particular problems in determining what constitutes "normal" levels in athletes. In addition, there is no reliable method available for the detection of hGH and Epo through urine testing. Athletes continue to test positive for banned drugs that are available over-the-counter despite their having been taken inadvertently, without intent to enhance performance. Marijuana use is becoming widespread in society and the impact of this in sport is becoming evident. Doping control, through the IOC list, must continue as a primary objective for the IOC and the sports federations. Constant vigilance and a continued willingness to respond rapidly to change is a prerequisite for such a list. The IOC appears to recognise this need. There are, however, more fundamental issues to be considered. The concept of doping control must be supported by high quality research, effective education and international collaboration. More research is needed into the factors which induce an athlete to take drugs and into the effect, if any, that education on drugs is having on competitors. The most important area for change is the overriding need for international collaboration between the IOC, governments and sports federations. This applies to uniformity in the rules and regulations, consistency in the application and level of sanctions and cooperation on the dissemination of information and development of education policies.

Munoz-Guerra, J.; Carreras, D.; Soriano, C.; Rodriguez, C.; Rodriguez, A.F. (BISp 980531842)

Use of ion trap (GC-MS-MS) mass spectrometry for detection and confirmation of anabolic substances at low concentration levels in doping analysis (Nutzen der Ionenfalle-(GC-MS-MS)-Massenspektrometrie für die dopinganalytische Entdeckung und Bestätigung anaboler Substanzen auf niedrigster Konzentrationsebene)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 169-183, ISBN 3-89001-016-4

These results prove that the use of the GC-MS-MS ion trap system is effective in the analysis of complex matrices such as urine. This technique has been shown to be a powerful tool for the detection and confirmation of anabolic substances at low

concentrations in urine samples proceeding from sporting competitions. The analytical method used was highly sensitive, easy to optimize, time saving and allows to confirm anabolic substances at concentrations levels at which injecting by Single Ion Monitoring it is only possible detection. Therefore GC-MS-MS is a good complement to the SIM or similar GC-MS methods for analyzing anabolic compounds.

No author (BISp 990639937)

**International Olympic Charter Against Doping in Sport
(Die Internationale Olympische Charta gegen Doping im Sport)**

Olymp. Rev., Lausanne 26 (August/September 1998), 22; 7

Nolteernsting, E.; Schänzer, W. (BISp 980531839)

Performance test of the new mass selective detector HP 5973 in routine dope analysis of anabolic androgenic steroids

(Leistungsprüfung des neuen massenselektiven Detektors HP 5973 in der Routine-Dopinganalyse anabol-androgener Steroide)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 149-156, ISBN 3-89001-016-4

Operation, data evaluation and column exchange could be done easily and without any problems on this HP5973. The sensitivity for the tested silylated metabolites of anabolic androgenic steroids has been increased by a factor of 5 to 10 in comparison to the HP5971 used in our laboratory. This sensitivity has been stable over about 600 samples in a 13 days time period.

Nutter, J.; Rauhe, B. (SIRC 449295)

Preventing anabolic steroid use: Guidelines and activities

(Die Prävention des Gebrauchs anaboler Steroide: Richtlinien und Aktivitäten)

J. of Health Educ., Reston (Va.) 28 (November/December 1997), 6; 364-369

Anabolic steroids have become increasingly popular among professional athletes and college, high school, and junior high school students. Because of the negative physical and psychological consequences of the drugs, it is essential that information about anabolic steroids is included in the school health curriculum. Unfortunately, there is little information about effective educational activities and strategies for preventing anabolic steroid use. Practical suggestions for planning education programs as well as a variety of sample activities and strategies that can be easily adapted for different age groups are described. Special emphasis is placed on case studies since they can be readily integrated into other health-related topics. Many of the activities are particularly well-suited for integration with other academic subjects. Education efforts should also include educating adults such as parents, school officials, counselors, coaches, athletic trainers, and health care professionals, including physicians and school nurses, about the risks of anabolic steroid use and how to recognize anabolic steroid use.

Pascual, J.A.; Torre, X. de la; Segura, J. (BISp 980531837)

High sensitivity analysis of anabolic agents: Some alternative instrumental possibilities

(Hochempfindliche Analyse zum Nachweis von Anabolika: Einige alternative instrumentelle Möglichkeiten)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 103-119, ISBN 3-89001-016-4

The aim of the present work is to show the use of the new GC/MS "GCQ" based on an ion

trap mass detector with external ion source in the analysis of quality control samples at the low concentrations required by the IOC as well as to extend its use to a general screening procedure covering most of the anabolic agents currently monitored.

Perry, P.J.; MacIndoe, J.H.; Yates, H.R.; Scott, S.D.; Holman, T.L. (SIRC 458163)

Detection of anabolic steroid administration: Ratio of urinary testosterone to epitestosterone vs the ratio of urinary testosterone to luteinizing hormone (Der Nachweis der Verabreichung anaboler Steroide: Das Verhältnis von urinärem Testosteron zu Epitestosteron im Vergleich zum Verhältnis von urinärem Testosteron zu luteinisierendem Hormon)

Clin. Chem., Washington 43 (May 1997), 5; 731-735

Popot, M.A.; Garcia, P.; Bonnaire, Y. (BISp 980531843)

Screening and confirmation method for the detection of synthetic corticosteroids in human urine

(Screening- und Bestimmungsmethode zur Entdeckung synthetischer Kortikosteroide im menschlichen Urin)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 185-189, ISBN 3-89001-016-4

The purpose of the present study was (1) to investigate if the screening and confirmatory methods available in the authors' laboratory for the control of synthetic corticosteroid in the horse are accurate for human corticosteroids antidoping purpose; (2) to evaluate the use of corticosteroids in human sport. The results confirm that ELISA, HPLC/APCI/MS are suitable techniques in terms of specificity and sensitivity for the screening and confirmation of synthetic corticosteroid in human urine. It also indicates at least in France the frequent use of corticosteroids in cycling. However, as legislation allows the use of corticosteroids administered locally, it is not easy to differentiate doping cases from permissive medication.

Rossi, R.; Gambelunghe, C.; Parisse, I.; Ussia, F.; Rufini, S. (BISp 980531701)

A rapid method for analysis of urinary caffeine, an ergogenic drug, using HPLC (HPLC als schnelle Methode des Dopingnachweises von Koffein im Urin)

Med. dello Sport, Turin 50 (1997), 4; 413-416

Caffeine is a methylxanthine with a stimulant action present in the list of doping drugs. However, since a lot of beverages and "over the counter" medicines, such as products for analgesia, provide active doses of caffeine, an antidoping control is estimated positive only if the urinary concentration of this drugs is higher than 12 micro-g/ml. In the context of sporting activities, concentrations of caffeine higher than 12 micro-g/ml are considered to have been ingested as an ergogenic aid. The capacity of the drug to mask the sensation of fatigue could induce athletes to exceed the natural limit of physical performance. Moreover, caffeine can potentiate the thermogenic effects of some stimuli (cold exposure, physical exercise and use of sympathomimetic drugs), causing hyperthermia. This is probably the cause of death of some athletes, especially in competitive cycling. The method described in this paper for the determination of urinary caffeine by HPLC is very simple, precise, reproducible and is suitable for routine laboratory utilization.

Sachtleben, T.R.; Berg, K.E.; Cheatham, J.P.; Felix, G.L.; Hofschire, P.J. (BISp 971228704)

Serum lipoprotein patterns in long-term anabolic steroid users (Serum-Lipoproteinmuster bei langfristigem Konsum anaboler Steroide)

Res. quart. for Exerc. & Sport, Reston (Virg.) 68 (1997), 1; 110-115

The authors measured serum lipoprotein and apolipoprotein levels in a group of weight trainers who used anabolic steroids and compared the levels with those in a group of weight trainers who did not use anabolic steroids. Lipoprotein and apolipoprotein levels of steroid users after more than 8 weeks of abstinence were compared with levels at the peak of their steroid cycle. The results of the study suggest that long-term use of anabolic steroids, especially in athletes exposed to their atherogenic effects over long periods by frequent cycling protocols, have potentially deleterious effects on serum lipids. It follows that these athletes appear to be at risk for the development of early atherosclerosis.

Samaranch, J.A. (BISp 990639939)

The fight against doping (editorial)
(Der Kampf gegen Doping (Editorial))

Olymp. Rev., Lausanne 26 (October/November 1998), 23; 3-4

The International Olympic Committee has always endeavoured to adapt, as best as it can, to the constantly changing conditions of the fight against doping. Doping is not only a danger for the health of athletes, it also constitutes a form of cheating which cannot be accepted. The IOC was the first, in 1968, to assume responsibility for the fight against the use of doping substances, and it intends fully to carry on, in close collaboration with the International Sports Federations, the National Olympic Committees, and inter- and non-governmental organizations.

Sauerwein, H.; Gleixner, A.; Meyer, H.H.D. (BISp 980531826)

Clenbuterol: Longterm detection via hair analysis
(Clenbuterol: Langzeitnachweis über die Haaranalyse)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 27-40, ISBN 3-89001-016-4

Taking the results from the calf model study and the human samples together, hair analysis allows to detect the application of Clenbuterol well beyond the time of positive measurements in urine or plasma. Hair analysis thus provides a powerful tool for the control of Clenbuterol doping in sports.

Schänzer, W. (BISp 980229732)

Der aktuelle Stand der Dopinganalytik
(The current status of doping analysis)

Doping im Sport – zwischen biochemischer Analytik und sozialem Kontext. Symposium, Köln, 4. Nov. 1995, in memoriam Prof. Dr. Manfred Donike. Cologne: Sport & Buch Strauß, 1997. 9-26, ISBN 3-89001-047-4

Der Nachweis von Doping mit Peptidhormonen ist noch nicht möglich. Die Entwicklung geeigneter Verfahren ist aber in Vorbereitung. Die aktuellen Probleme der Dopinganalytik, die erfolgreich bearbeitet werden, beziehen sich in erster Linie auf die Verbesserung von Nachweismethoden der anabol wirksamen Substanzen, die im wesentlichen in der Trainingsphase eingesetzt werden. Hierbei werden verbesserte Isolierungsverfahren sowie neuere analytische Meßgeräte auf dem Gebiet der Massenspektrometrie eingesetzt. Die hohe Anzahl von positiven Fällen bei internationalen Kontrollen, die im Kölner Labor durch den Einsatz der hochauflösenden Massenspektrometrie aufgefunden und bewiesen werden konnten, stellen einen weiteren Erfolg im Kampf gegen das Doping im Sport dar.

It is not yet possible to verify doping using peptid hormones although the development of suitable methods is being prepared. The main focus of the research dealing with doping

analysis is currently on the optimization of methods to detect anabolic agents, which are mainly used during training. In this context improved isolation methods as well as modern analytical measuring devices from the area of mass spectrometry are used.

Schänzer, W. (BISp 980733226)

**Doping – Informationen zu Neuentwicklungen und Problemfeldern. 1. Teil:
Neuentwicklungen**

(Doping – Information about new developments and problematic areas. Part 1: New developments)

Leistungssport, Münster 28 (1998), 4; 14-17

Zu den Nebenwirkungen der Analytik im Bereich der anabolen Wirkstoffe ist die Verbesserung des Nachweises synthetischer Steroide mittels der hochauflösenden Massenspektrometrie (HRMS) und die Anwendung der Kohlenstoffisotopen-Massenspektrometrie zum Nachweis von Doping mit körpereigenen Steroidhormonen zu zählen. Die HRMS wird in Köln seit 1992 für die Dopingkontrolle von Anabolika erforscht und routinemäßig eingesetzt. Das Prinzip der HRMS beruht darauf, daß die zu bestimmenden Substanzen keine ganzzahligen Molekülmassen besitzen. Das Gleiche gilt dann auch für die im Massenspektrometer nach Elektronenbeschuß gebildeten Zerfallsbruchstücke (Fragmentationen). Bei der Berechnung der Massenzahlen für die anabolen Steroidhormone und deren Metaboliten ergeben sich Dezimalzahlen. Mit der HRMS kann das Massenspektrometer so eingestellt werden, daß nur Ionen mit Massenzahlen innerhalb bestimmter Fenster registriert werden. Alle Massen außerhalb dieser Fenster werden nicht registriert und können somit auch nicht mit einer verbotenen Substanz interferieren. Die Kohlenstoffisotopenmethode wird seit Ende 1996 im Institut für Biochemie der DSHS Köln erforscht und zur Absicherung verdächtiger Befunde mit endogenen Steroidhormonen routinemäßig eingesetzt. Mit dieser Methode ist es möglich, eine Unterscheidung vorzunehmen, ob der erhöhte Testosteronwert durch die körpereigensynthese (kein Doping) oder durch exogene Zufuhr (Doping) verursacht wurde. Die Haaranalytik ist eine Methode, die z.Zt. sehr umfangreich in der Toxikologie und der Gerichtsmedizin eingesetzt wird. Insbesondere werden basische Verbindungen wie Opioide vom Morphintyp im Haar eingelagert und ermöglichen somit einen Nachweis der Anwendung dieser Verbindungen anhand von Haaren. Der Haarnachweis kann für viele Verbindungen in Abhängigkeit von der Dauer und Menge der verwendeten Drogen selbst nach Absetzen der Droge noch nach Monaten geführt werden. Diese Analytik wäre demnach nur für Substanzen von Interesse, die in der Trainingsphase verboten sind.

The author explains the methods of detecting synthetic steroids using High Resolution Mass Spectrometry (HRMS) and of verifying doping with endogenous steroid hormones by means of carbon isotope mass spectrometry. Hair analysis is a method which is used very intensively in toxicology and forensic medicine. Especially alkaline compounds such as opioids of the morphine type are stored in hair and thus enable the verification of the use of these substances by hair analysis. The verification of drug intake by hair analysis is still possible months later and even after drug intake has been stopped. This method of analysis would therefore be of special interest for substances whose intake is forbidden during the training phase.

Schänzer, W. (BISp 980934298)

**Doping – Informationen zu Neuentwicklungen und Problemfeldern. 2. Teil:
Problemfelder**

(Doping – Information about new developments and problematic areas. Part 2: Problematic areas)

Leistungssport, Münster 28 (1998), 5; 42-45

Ziel dieses Beitrags ist es, auf Fortschritte im Kampf gegen Doping sowie auf noch zu lösende Aufgaben und Problembereiche aufmerksam zu machen. Verf. thematisiert auf den Nachweis von Peptidhormonen – Epo und Wachstumshormonen – sowie die Problematik im Zusammenhang mit Coffein sowie den Stimulantien und Narkotika als Wettkampfdopingmittel.

This article deals with the verification of peptid hormones – Epo and growth hormones – as well as with problems in connection with caffeine as well as stimulants and narcotics as doping substances taken during competition.

Schänzer, W.; Geyer, H.; Gotzmann, A.; Marek-Engelke, U. (Eds.) (BISp 980531823)
Recent advances in doping analysis (5) . Proceedings of the Manfred Donike Workshop, 15th Cologne Workshop on dope analysis, 23rd to 28th February 1997 (Aktuelle Fortschritte in der Dopingsanalyse (5). Bericht des Manfred Donike Workshops, 15. Kölner Workshop zur Dopingsanalyse, 23. bis 28. Februar 1997)
Cologne: Sport & Buch Strauß, 1998. 337 pp., ISBN 3-89001-016-4

Verschiedene Aspekte der Dopingsanalytik werden behandelt. Die Beiträge sind folgenden Themenkreisen zugeordnet: I. Anabolika, II. Steroid Profiling, III. Probenpräparation, IV. Techniken der Massenspektrometrie, V. Peptidhormone, VI. Stimulantien, VII. Neue Aspekte (DNA-Typing, Kapillar-Elektrophorese, Dextropropoxyphen-Analyse, Benzodiazepin-Screening).

Different aspects of doping analysis are dealt with: (1) Anabolic agents; (2) Steroid profiling; (3) Sample preparation; (4) Techniques of mass spectrometry; (5) Peptid hormones; (6) Stimulants; (7) New aspects (DNS typing, capillary electrophoresis, dextropropoxyphene analysis, benzodiazepine screening).

Schänzer, W.; Geyer, H.; Horning, S. (BISp 980531824)
Long-term determination of metandienone and mestanolone (Langzeitnachweis von Metanabol und Mestanolon)
Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 13-26, ISBN 3-89001-016-4

Besides instrumental improvement research was focused on the metabolism of anabolic androgenic steroids with the aim to identify metabolites detectable for the longest time after administration. Here an overview of long-term excreted metabolites of metandienone and mestanolone is presented. The use of high resolution mass spectrometry (HRMS) in screening of synthetic anabolic androgenic steroids has increased the retrospecificity in detection of steroid misuse. Although there was high number of metandienone positives in Cologne by HRMS there was no positive finding for mestanolone during the same time period. Even long-term excreted metabolites were controlled.

Schänzer, W.; Gotzmann, A. (BISp 980531865)
The Cologne protocol to follow-up positive caffeine cases (Das Kölner Protokoll einer Nachuntersuchung zu einem positiven Koffein-Dopingfall)
Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 259-268, ISBN 3-89001-016-4

Caffeine is banned in competition with a quantitative limit of 12 micro-g caffeine / ml of urine. This level can be exceeded if beverages containing a high quantity of caffeine are consumed. It is impossible to determine the exact amount of caffeine intake, which can be

used without exceeding the 12 micro-g/ml limit. As caffeine metabolism can vary very much between individuals, athletes can violate the doping rule if their individual caffeine metabolism enables the excretion of a high percentage of unmetabolized caffeine. A caffeine study (application of 300 mg of caffeine) with athletes is recommended to establish individual caffeine metabolism.

Schmitt, A. (BISp 990338015)

Das Doping-Problem aus Athletensicht

(The problem of doping from the point of view of the athletes)

Leistungssport, Münster 29 (1999), 2; 34-35

Verf. nimmt aus der Perspektive der Athletinnen und Athleten Stellung zur Doping-Problematik und beschreibt, wie die Sportler sich eine erfolgsversprechende Doping-Bekämpfung vorstellen. Es werden folgende Punkte angesprochen: 1. die Grenzen der Einflußnahme; 2. zur Selbstreinigungskraft des Sports; 3. Maßnahmen der Doping-Bekämpfung.

The author discusses the problem of doping from the point of view of the athletes and describes how athletes think a successful fight against doping should be like. The following aspects are dealt with: 1. Limits of influence, 2. the self-purification power of sport, 3. measures of fighting against doping.

Shackleton, C.H.; Roitman, E.; Phillips, A.; Chang, T. (SIRC 451597; 481835)

Androstanediol and 5-androstanediol profiling for detecting exogenously administered dihydrotestosterone, epitestosterone, and dehydroepiandrosterone: Potential use in gas chromatography isotope ratio mass spectrometry (Androstandiol- und 5-Androstandiol-Profilierung zum Nachweis exogen zugeführten Dihydrotestosteron, Epitestosteron und Dehydroepiandrosteron: Der potentielle Einsatz bei der Gaschromatographie-Isotop-Quotienten-Massenspektrometrie)

Steroids, Woburn (Mass.) 62 (October 1997), 10; 665-673

Stenman, U.H.; Unkila-Kallio, L.; Korhonen, J.; Alfthan, H. (SIRC 453142)

Immunoprocudures for detecting human chorionic gonadotropin: Clinical aspects and doping control

(Immunoverfahren zum Nachweis von HCG: Klinische Aspekte und Dopingkontrolle)

Clin. Chem., Washington 43 (July 1997), 7; 1293-1298

Stoner, C. (SIRC 456906)

Recent developments in doping control

(Neuere Entwicklungen in der Dopingkontrolle)

Sports Law Adm. & Pract., Sudbury (England) 4 (November/December 1997), 7; 1, 3-5

Thieme, D.; Grosse, J.; Lang, R.; Müller, R.K.; Wahl, A. (BISp 980531841)

Interpretation of high resolution and tandem MS data: Two relevant cases of anabolic steroid metabolites at pg level in blood and urine

(Interpretation von Daten der Hochauflösungs- und Tandem-Massenspektrometrie: Zwei relevante Fälle des Nachweises von Metaboliten anaboler Steroide auf pg-Ebene im Blut und Urin)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 157-168, ISBN 3-89001-016-4

The identification and confirmation of metabolites of methandienone in urine and of stanozolol in blood and cerebrospinal fluid was possible by application of HRMS and especially of tandem MS. Detection limits of 100pg/ml could be achieved for confirmation of the substances in several cases, where certain hints allowed to direct the analysis to few target substances. Detection and confirmation of two long term metabolites of methandienone were preferably carried out by MS/MS, mainly due to a higher number of undisturbed fragmentation reactions available. The application of an HPLC clean-up permits the reduction of background and the formation of different derivatives for each metabolite. The confirmation of 3'-OH-stanozolol in biological post mortem materials was possible after formation of per-TMS derivatives by HRMS or MS/MS. Only this metabolite could be detected in all specimen (blood, cerebrospinal fluid, liver) after hydrolysis. Signals in HRMS or MS/MS proved to have a much higher uniqueness, compared to conventional MS and allow to improve peak to noise ratios. But the possibility of interferences becomes more relevant with lower abundant signals for lower concentration ranges. The final decision whether peaks or spectra can be considered as 'undisturbed' and enable the identification of substances beyond reasonable doubts are still arbitrary.

Tsoutsoulova-Draganova, A.; Halatcheva, N.; Karova, D. (BISp 980531856)

**Metabolism of benzphetamine and clobenzorex in human urine
(Der Benzphetamin- und Clobenzorex-Stoffwechsel im menschlichen Urin)**

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 231-248, ISBN 3-89001-016-4

The metabolism of the stimulants benzphetamine and clobenzorex in human urine after a single oral dose are investigated. Several new hydroxymetabolites of benzphetamine and clobenzorex as well as the well-known metabolites – amphetamine, methamphetamine and desmethylbenzphetamine – are found and identified in the collected urine samples up to 48th hour after administration. Conjugated urinary metabolites are detected after hydrolysis. Their structures are identified by gas chromatography/mass spectrometry using the different derivatization procedures – methylation, silyllation, selective derivatization, cyclization with methaneboronic acid. The fragmentation of some type of different derivatives is discussed and the probable metabolism scheme of benzphetamine and clobenzorex is proposed.

Ueki, M.; Okano, M.; Ikekita, A.; Hiruma, T.; Sato, M. (BISp 980531829)

**Epiandrosterone glucuronide as a sign to indicate natural hormone doping
(Epiandrosteronglukuronid als Hinweis auf Doping mit körpereigenen Hormonen)**

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 71-82, ISBN 3-89001-016-4

One difficulty of dope analysis stems from the origin of the dope agents. As the detection of synthetic anabolic steroid became relatively easy and since there was no procedure available that could differentiate certain exogenous natural hormones, several physiological steroids, its esters and the precursors became a popular substitute of synthetic anabolic agents. For steroid abusers, the main purpose of the use of the free or the various ester form of T and DHT is not just a performance enhancement because the products were proven to be less anabolic and more androgenic than synthetic anabolic steroids. This paper refers to the re-investigation of the metabolism of T and DHT by means of stable isotope methodology. 19,19,19-trideuteromethylated tracers were applied to adult male volunteers and the urinary steroid profiles were measured after fractionation of the conjugates. The formation of 3 beta-hydroxy metabolites, e.g. 5alpha-androstane-3beta, 17beta-diol and epiandrosterone in the glucuronide fraction appeared to be the important sign of the exogenous application of T and DHT. Major part of these steroids

were usually sulfo-conjugated, and no significant amount of 3 beta-hydroxy steroid glucuronides present in the urine of hCG stimulation test samples. The study shows the difference of the metabolism between the exogenous steroids and the endogenously secreted steroids.

Wang, S. (SIRC 462173)

(Determination of hCG in doping control by domestic ELISA kits/Bestimmung von HCG im Rahmen der Dopingkontrolle mittels der ELISA Testausstattung für den häuslichen Einsatz)

Chin. J. of Sports Med., Beijing 16 (1997), 4; 280-282

A domestic quantitative ELISA kit was used in the determination of hCG in 2 volunteers who had been administered 2000 IU hCG intramuscularly. HCG was detectable in serum and urine within 4 to 5 days' period after administration. The kit was also used in the I.O.C. Proficiency Test (1994) and the Reaccreditation Test (1995) for accredited doping control laboratories and the results were given and discussed.

Youxuan, X.; Moutian, W.; Li, S.; Yun, W.; Shan, W.; Kairong, C.; Changjiu, Z. (BISp 980531881)

Studies on the analysis of dextropropoxyphene and its metabolite in human urine (Untersuchungen zur Analyse von Dextropropoxyphen und seines Metaboliten im menschlichen Urin)

Recent advances in doping analysis (5). Cologne: Sport & Buch Strauß, 1998. 311-316, ISBN 3-89001-016-4

The structure of dextropropoxyphene (PP) was modified to improve its GC properties due to its thermal instability. The modification reaction involved a hydrolysis in ethanol and a trimethylsilation. The product was much more sensitive than PP by GC analysis and suitable for the confirmation of PP positive cases.

Zeng, F.; Yang, X.; Yang, Z. (SIRC 462465)

(Research methods for testing the misuse of exogenous growth hormone in athletes/Forschungsmethoden zum Nachweis des Mißbrauch exogen verabreichten Wachstumshormons an Sportler)

Sports Sci., Beijing 18 (7 January 1998), 1; 79-82

3. Artikel zu geschichtlichen und sozialpolitischen Aspekten des Dopings im Sport / Articles focussing on historical and sociopolitical aspects of doping in sport

Applegate, E.A.; Grivetti, L.E. (SIRC 458547)

Search for the competitive edge: A history of dietary fads and supplements (Die Suche nach dem entscheidenden Vorteil: Eine Geschichte diätetischer Modeerscheinungen und Ergänzungsstoffe)

J. of Nutr., Bethesda (Md.) 127 (1997), 5 Suppl.; 869S-873S

Beuker, F. (BISp 971027571)

Die gedopte Gesellschaft (Doped society)

In: Yaldai, S.; Stemper, Th.; Wastl, P. (Eds.): Menschen im Sport. Geschichtliche, ethische, pädagogische, gesellschaftliche und gesundheitliche Aspekte. Cologne: Sport und Buch Strauß, 1997, 282-289, ISBN 3-89001-063-6

Doping im Sinne der allgemein geübten Leistungsstimulation ist aus gesellschaftlicher Sicht nicht, im Sport jedoch aufgrund des Fairness-Gebots verboten. Dabei ist der chemische Eingriff in die Dimensionen natürlicher Fähigkeiten nichts anderes als die Modulation der Leistung durch Training, das in seinen verschiedenen Formen auch nur die differenzierten Möglichkeiten des Körpers entwickelt und anregt. Nicht jeder ist in der Lage, so extensiv oder gut zu trainieren wie der andere. Auch hierin ist eigentlich eine Verletzung der Fairness gegeben, da doch die Bedingungen ungleich sind und die unterschiedlichen Voraussetzungen unterschiedlich entwickelt werden. Im Falle des Dopings wird der Sportler zum wesentlichen Schuldträger abgestempelt, während die Gesellschaft, die im Grunde die Basis für die Handlungsweise bzw. die entsprechenden Bestimmungen bietet, überhaupt nicht bestraft wird; sie nimmt noch nicht einmal ihre Mitschuld zur Kenntnis. Angesichts dieser Widersprüchlichkeit fordert Verf. u.a. eine Aufklärungsaktion im gesamtgesellschaftlichen Umfeld, die nicht nur die Wirkung der einzelnen schädlichen und verbotenen Substanzen definiert, sondern vor allem die prinzipielle Einstellung zu Stimulationsmitteln generell in Frage stellt und reguliert. Der Kampf gegen Doping muß multidisziplinär angegangen und als gesamtgesellschaftliches Anliegen verstanden werden.

While in the general society the intake of ergogenic substances to improve one's performance is not forbidden, such behaviour is banned in sport because of the principle of fairness. However, the chemical influence of natural abilities is basically not different from the modulation of performance through athletic training, whose only goal is also to stimulate and develop the physical possibilities. Not every athlete is able to train as extensively as his or her competitors. So training is actually a violation of the fairness principle, too, because the conditions of the different athletes are unequal and different prerequisites are developed in a different way. In the case of doping, the athlete is labeled as the chief offender, whereas society as the actual basis of the athlete's behaviour is neither punished nor even found guilty. Because of these inconsistencies the author demands a widespread educational campaign covering the whole society. This campaign should not only define the effects of the individual harmful substances but should mainly aim at changing the general attitude toward stimulants and controlling their use. According to the author the fight against doping must be conducted in a multidisciplinary way and should be understood as an important concern of the whole society.

Denham, B.E. (BISp 980430910)

Sports Illustrated, the "war on drugs", and the anabolic steroid control act of 1990 – A study in agenda building and political timing
("Sports Illustrated", the "Antidoping-Krieg" und das Gesetz von 1990 zur Kontrolle anaboler Steroide – Eine Untersuchung zur Thematisierungsfunktion und zum politischen Timing)

J. of Sport & soc. Issues, Thousand Oaks (Cal.), 21 (1997), 3; 260-273

This study considers the Anabolic Steroid Control Act of 1990 in light of the political climate of the late 1980s. A series of Sports Illustrated articles concerning the adverse consequences of steroid use are addressed, as are the broader social forces that may have led Congress to pass Legislation classifying steroids as Schedule III controlled substances. Articles from Sports Illustrated appeared in the appendixes of congressional hearings, and several individuals who appeared in those articles were invited to testify. From a theoretical base of agenda building, this study focuses on the relationships between media, policy makers, and

everyday news consumers.

Digel, H. (BISp 980733222)

Doping gestern – Doping heute. Das Dopingproblem bedarf einer fundierten Diskussion

(Doping yesterday – doping today. The problem of doping should be discussed on a sound basis)

Leistungssport, Münster, 28 (1998), 4; 5-7

Verf. vertritt die Auffassung, daß sich das Dopingproblem, wie es sich im Spitzensport in den 50er, 60er und 70er Jahren gestellt hat, von dem der 90er und zu Beginn des nächsten Jahrhunderts wesentlich unterscheidet. Es ist deshalb auch mit Schwierigkeiten verbunden, aus heutiger Sicht über Dopingverstöße in den vergangenen Jahrzehnten zu urteilen. Für die Beurteilung sollte vor allem beachtet werden, zu welchem Zeitpunkt das Dopingproblem in den internationalen Sportorganisationen als Problem erkannt wurde, wann die ersten Dopingbestimmungen in die Satzungen der internationalen Verbände aufgenommen wurden, wann in Wettkämpfen Dopingkontrollen durchgeführt wurden und wann mit den unangemeldeten Trainingskontrollen in den verschiedenen Verbänden begonnen wurde. Diese Sichtweise führt zu der Empfehlung, eine differenzierte Analyse des Dopingproblems zur Grundlage für die notwendigen Veränderungen zugunsten einer verantwortbaren Zukunft des Hochleistungssports zu machen. Eine oberflächliche, moralisierende Debatte kann Verf. zufolge nicht als hilfreich angesehen werden.

The author holds that there is a great difference between the problem of doping in high-performance sport during the fifties, sixties and seventies and the doping situation today. It is therefore difficult to judge doping violations from past decades from the point of view of today. When judging doping cases in the past it should be considered at what time the doping problem was identified as a problem in the international sport federations, at what time the first doping regulations were included in the statutes of the international federations, at what time in-competition doping tests were carried out and at what time unannounced in-training tests were started in the different federations.

Franke, W.W.; Berendonk, B. (SIRC 453264)

Hormonal doping and androgenization of athletes: A secret program of the German Democratic Republic government

(Hormondoping und Androgenisierung von Sportlern: Ein geheimes Programm der Regierung der DDR)

Clin. Chem., Washington 43 (July 1997), 7; 1262-1279

This report includes a detailed summary of classified documents from the former German Democratic Republic dealing with government promotion of the use of drugs in high performance sports.

Höfer, A. (BISp 981135460)

Stasi, Doping und Medaillen. Die DDR – ein Testfall für die Sportgeschichte (Stasi, doping and medals. The GDR – a test case for sport history)

Forsch. Innovat. Technol., Cologne (1998), 1; 33-39

Verf. stellt die Strukturen und Ziele des DDR-Sports unter politischen und geschichtlichen Gesichtspunkten dar. Insbesondere betrachtet er den Einsatz der

jeweiligen DDR-Staatsführung und deren Gebrauch des Sports für staatspolitische Zielsetzungen. Die sich daraus ergebenden Spannungen in sportlichen Begegnungen von DDR und Bundesrepublik Deutschland zeigt er exemplarisch an legendären Wettkämpfen in der Leichtathletik und in Fußballduellen auf. Verf. analysiert die Bereitwilligkeit und Umsetzung der Vergangenheitsbewältigung dieser Phase der deutschen Geschichte bis heute. Er fordert (Sport-)Historiker auf, die Vergangenheitsbewältigung als Chance und das Thema des DDR-Sports als Testfall zu nutzen.

The author describes the structure and goals of high-performance sport in the former GDR from a political and historical point of view. The main focus is on the manipulation of sport in order to reach national-political goals.

Jackson, S.J. (BISp 990136380)

Life in the (mediated) faust lane. Ben Johnson, national affect and the 1988 crisis of Canadian identity

(Leben in der (medialen) "Faust-Spur". Ben Johnson, nationaler Affekt und die Krise der kanadischen Identität 1988)

Int. Rev. for the Sociol. of Sport, München 33 (1998), 3; 227-238

Berichte rund um die Karriere des früheren kanadischen Sprinters Ben Johnson eignen sich besonders gut zur Untersuchung der politischen und diskursiven Ausbildung nationaler Identität. Unter besonderer Berücksichtigung der Mediendiskurse wird in dieser Studie untersucht, inwieweit 1988 eine Krise der kanadischen Identität konstruiert, angegangen und zeitweise in Frage gestellt wurde. Die Analyse verortet (a) die Diskussion nationaler Identität innerhalb dessen, was Hall als die beiden Hauptrichtungen der Konzeptualisierung von Identität innerhalb moderner Theorien identifiziert; schafft (b) einen Kontext, innerhalb dessen der sogenannten Krise einschließlich des vorherrschenden politischen, ökonomischen und kulturellen Zustandes der Nation ein Platz gegeben werden kann, und verfolgt (c) die aufkommenden Erörterungen der Affäre, um die verschiedenen Formen 'national affektiver' Antworten einschließlich oppositioneller Reaktionen darzustellen.

Narratives surrounding the career of former Canadian sprint Ben Johnson offer a unique site for examining the political and discursive formation of national identity. Focusing on media discourses, this study examines the nature and extent to which a crisis of Canadian identity was constructed, negotiated and, at times, challenged in 1988. More specifically, the analysis (a) locates the discussion of national identity within what Hall identifies as the two dominant ways of conceptualizing identity within contemporary theorizing; (b) provides a context within which to situate the so-called crisis, including the prevailing political, economic and cultural state of the nation; and (c) traces the emerging discourses surrounding the affair to illustrate the various types of 'national affective responses' including oppositional reactions.

Müller, R.K.; Grosse, J. (BISp 990640021)

Kreischa als Zentrum der Dopingforschung der DDR

(Kreischa as the centre of doping research in the former GDR)

In: Dresdner Geschichtsverein (Ed.): Geschichten vom Sport in Dresden, 1998. 79-82 = Dresdner Hefte; 55

Verf. gibt einen Überblick über die geschichtliche Entwicklung des Instituts für Dopinganalytik und Sportbiochemie (IDAS) in Kreischa, das zu Zeiten der DDR vor

allem die offiziell angeordneten "Ausreisekontrollen" analysierte, mit denen die Sportführung das rechtzeitige Absetzen von Dopingmitteln vor Wettbewerben im Ausland kontrollierte. Dadurch solle gewährleistet werden, daß bei Dopingkontrollen keine positiven Befunde von DDR-Athleten auftreten konnten. Im März 1994 wurde das IDAS neu akkreditiert und führt inzwischen eine jährlich steigende Zahl von Dopinganalysen für die Sportverbände des Deutschen Sportbundes und für weitere nationale und einige internationale Sportverbände aus.

The author describes the historical development of the Institute for Doping Analysis and Sport Biochemistry (IDAS) in Kreischa. At the time of the former GDR the main function of this institute was to test whether East German athletes who were about to travel to meetings abroad had stopped the intake of banned drugs, which were administered by state authorities, early enough so that they were not in danger of testing positive. In March 1994 IDAS was newly accredited and today is carrying out a yearly increasing number of doping analyses for the sport associations under the umbrella of the German Sport Federation and for some international federations.

Nocelli, L.; Kamber, M.; Francois, Y.; Gmel, G.; Marti, B. (BISp 981034916)

Discordant public perception of doping in elite versus recreational sport in Switzerland

(Widersprüchliche öffentliche Wahrnehmung des Dopings im Spitzen- im Vergleich zum Freizeitsport in der Schweiz)

Clin. J. of Sport Med., New York 8 (1998), 3; 195-200

Objective: To assess public awareness of performance-enhancing drug use, that is, doping in sport in Switzerland. Design: Representative telephone survey in September 1995. Setting: Two of the three Swiss linguistic areas (French and German), representing 96% of the entire Swiss population. Subjects: A total of 1201 respondents between 18 to 74 years old, selected by stratified random sampling. Main outcome measures: Perception of the doping problem in elite versus recreational sport, estimated prevalence of doping in different sports, parents' decisions to keep children out of sport because of doping. Results: The use of doping in sport was perceived as a "somewhat serious problem" or "very serious problem" by 84% of the respondents for elite sport and by 44% for recreational sport ($p < 0.01$ for difference). Doping was mostly perceived to represent a physical health problem or an ethical problem. Track and field (79%) and cycling (27%) were most often cited as sports having doping problems, and 35% of the respondents believed that >60% of bodybuilders use doping. The black market (91%), athletes and trainers (80%), and fitness centers (74%) were the most frequently mentioned sources of doping substances. Thirteen of 14 parents would not dissuade their children from participating in sport because of a concern about the problems of doping. Conclusions: The Swiss population perceives a high prevalence of doping in sports. There is a clear distinction, however, made by the respondents between the estimated prevalence of doping in elite sport, seen overwhelmingly as a "very serious problem" or "somewhat serious problem," and recreational sport, in which doping is less often seen as a problem. Doping is considered a serious threat to health and ethics in sport, but despite this judgment, only a few parents would hold back their children from sport because of the risks of doping.

Spitzer, G. (BISp 990337807)

Doping in der DDR. Ein historischer Überblick zu einer konspirativen Praxis. Genese – Verantwortung – Gefahren
(Doping in the GDR. A historical survey of conspiratorial practice. Origin and development – responsibility – dangers)

Cologne: Sport und Buch Strauß, 1998. 434 pp., ISBN 3-89001-320-1 =
Wissenschaftliche Berichte und Materialien des Bundesinstituts für
Sportwissenschaft; vol. 1998, 3

Mit dieser Untersuchung, die insbesondere auf den Akten und Vorgängen der einzelnen staatlichen Einrichtungen des DDR-Sportsystems und der diesen Stellen nachgeordneten Verbände und Vereinigungen einschließlich Clubs basiert, wird umfassend die These vom staatlichen Doping in der DDR belegt. Von Mitte der fünfziger Jahre bis zum Ende der DDR haben Staat und Verbände und einzelne Personen ein hohes Interesse an der Manipulation des sportlichen Geschehens bekundet und damit die Idee des fairen Miteinanders, des sportlichen Wettbewerbes im Interesse ideologischer Ziele ausgehöhlt. Mit Aufputschmitteln fing es an, mit dem flächendeckenden, vom Sportmedizinischen Dienst der DDR offiziell kontrollierten System mit Ausreisekontrollen endet das System. Das DDR-Doping-System hat Bezüge zu einem frühkapitalistischen System der Ausbeutung: Im Interesse einer staatlichen Ideologie wurden junge Menschen, Sportler, manipuliert, um Höchstleistungen zu erzielen. Hinzu kam, daß Trainer auch des eigenen Vorteils wegen die staatliche Manipulation nicht nur unterstützten, sondern die Athleten bewußt und ohne Rücksicht auf deren Gesundheit ausnutzten. Aber auch die Clubs waren an "Stars" interessiert, denn sie sicherten ihnen Aufmerksamkeit und staatliche Zuneigung – auf Kosten der Athleten. Durchweg waren es also die Athleten, die im Arbeiter- und Bauernstaat der DDR das Opfer zu tragen hatten.

This study is a convincing proof of the thesis that doping in the former GDR was controlled by state authorities. From the middle of the fifties until the end of the GDR the government, federations as well as individual persons had a great interest in manipulating athletes and this way undermined the idea of fair sporting competition in the interest of ideological goals. At the beginning there were stimulants while in the end there was a large-scale system of exit controls preventing GDR athletes from testing positive at meetings abroad. The author compares the sport system of the GDR to an early capitalist system of exploitation: In the interest of a political ideology athletes were manipulated to achieve maximal performances.

Vandeweghe, H. (BISp 971128072)

Le grand proces

(Der große Prozeß: Die Umwandlung des DDR-Sportsystems/The great process: The change of the sport system of the GDR)

Sport et vie, Quetigny (1997), 44; 63-69

Verf. geht der Frage nach, ob es in der ehemaligen DDR ein generelles, organisiertes Dopingsystem gegeben hat. Es werden die strukturellen und finanziellen Voraussetzungen betrachtet und die Zentren des Hochleistungssports genannt. Zu diesem Thema wird neben Journalisten auch M. EWALD befragt, der ehemalige Präsident des Nationalen Olympischen Komitees der DDR. Das Potential an herausragenden Sportlern erschöpfte sich nach der Wiedervereinigung und zeigt sich heute noch an Ausnahmeathleten wie Franziska van Almsick und Jan Ullrich. Vergleiche zwischen Ost- und Westdeutschland werden angestellt, und

die Umwandlung und Anpassung politischer Gegebenheiten in der DDR an westdeutsche Verhältnisse werden exemplarisch beschrieben.

The author describes the structure and financial basis of the sport system of the former GDR, which also included a sophisticated system of doping organized by the government. Following the German reunification this system was destroyed and replaced by the sport system of West Germany.

4. Publikationen zu rechtlichen Problemen des Dopings / Publications dealing with legal problems of doping in sport

Andersen, M.B.; Auberg, M. (SIRC 478495)

Er idrettsutoveres rettssikkerhet i dopingsaker for darlig? Dopingregler i utakt med rettsreglene i samfunnet for ovrig?

(Ist der Rechtsschutz von Sportlern in Dopingfällen gut genug? Sind die Dopingregeln mit der Rechtsprechung in der Gesamtgesellschaft im Einklang?/Is the athlete's legal protection in doping cases good enough? Are doping rules out of step with justice in society as a whole?)

Norsk tidsskrift for idrettsmedisin, Hamar (Norway) 13 (1998), 1; 30-31

Cajsel, W. (BISp 981034956)

Dyskwalifikacja za stosowanie dopingu w swietle przepisow prawa pracy

(Disqualifikation wegen Dopings unter arbeitsrechtlichem

Aspekt/Disqualification because of doping from the point of view of the law of employment)

Sport wyczynowy, Warschau 36 (1998), 7-8; 88-93

Bis zum 18. Januar 1996, als in Polen das neue "Gesetz zur Körperkultur" in Kraft trat, konnten die Sportler ihre Rechte nur auf dem Weg von Zivilprozessen erreichen. Gegenwärtig, dank der Aufnahme eines Arbeitsverhältnisses, wurde ihre Rechtssituation verbessert, was nicht immer den Beifall seitens der Sportklubs findet. Es kommt in diesem Zusammenhang zur Notwendigkeit der Übernahme erhöhter Ausgaben, z.B. für die soziale Absicherung, was in der Situation der ökonomischen Krise im polnischen Sport nicht unbedeutend ist. Im Kern des Problems muß man feststellen, daß der Profisportler, der ein Arbeitsverhältnis mit einem Klub eingeht, sich zur Ausführung einer bestimmten Arbeit für die Sache seines Arbeitgebers und unter dessen Leitung verpflichtet, und der Arbeitgeber zu seiner Beschäftigung und Bezahlung. Und alles wäre in bester Ordnung, wenn nicht die Strafe der Disqualifikation bestünde, die dem Sportler vom Verband für die Einnahme unerlaubter Dopingmittel ausgesprochen werden kann, die zu einem Hindernis in der Realisierung der Pflichten des Arbeitnehmers wird. In Abhängigkeit von der Länge der Strafe hat das verschiedene Konsequenzen auf dem Gebiet des Arbeitsverhältnisses. Eine große Bedeutung wird die Gewährung oder Nichtgewährung von "Hilfe" für den Athleten durch den Sportklub im Prozeß der Dopingeinnahme haben. Dieser Problematik ist der vorliegende Artikel, der zur Klärung vieler Probleme, die mit der Rechtssituation infolge von Disqualifikationen durch Dopingeinnahme im Zusammenhang stehen, beitragen soll, gewidmet.

On January 18, 1996, the new "law of physical culture" came into operation in Poland. According to this law professional athletes are employed by the clubs. This means an improvement of their legal security because the clubs must pay for their working performance and their social security. On the other hand, the athletes have the duty to perform work (i.e. to play sport) for their clubs. However, there is a

problem if the athlete is disqualified because of doping. In this case he or she is no longer able to do his job for his or her club. This article deals with the legal situation of employed athletes who have been disqualified because of doping violations.

Cajsel, W. (BISp 980934016)

**Prawne aspekty zwalczania dopingu w polskim sporcie
(Rechtliche Aspekte im Kampf gegen das Doping im polnischen Sport/Legal aspects of the fight against doping in Polish sport)**

Sport wyczynowy, Warschau 36 (1998), 5-6; 50-56

Verf. präsentiert und kommentiert Rechtsverordnungen im Zusammenhang mit dem Gesetz vom 18. Januar 1996 über die Körperkultur und geht insbesondere auf den Abschnitt "Kampf gegen Doping im Sport" ein: 1. Artikel 47 mit der Definition des Dopings; 2. Artikel 48 mit der Beschreibung der Tätigkeit und Verantwortung der Kommission für den Kampf gegen das Doping im polnischen Sport; 3. Artikel 49 mit der Verpflichtung der Sportler, sich Antidopingkontrollen zu unterziehen; 4. Artikel 50 behandelt die Verantwortlichkeit für die Sicherheit, Ordnung und hygienischen Bedingungen für das Sporttreiben, für Körperkultur und Touristik; 5. Ein weiteres Problem, das bei einer Analyse des Rechtszustandes im Kampf gegen das Doping im polnischen Sport aufkommt, ist die Verantwortlichkeit auf dem Gebiet der Rechtsvorschriften; 6. Auf der Grundlage der Analyse der Rechtssituation im polnischen Sport ist zu schlußfolgern, daß es die entsprechenden Rechtsvorschriften gibt, die den Kampf gegen Doping im Sport effektiv gestalten können.

The author presents and comments on legal regulations in connection with the "law of physical culture" from January 18, 1996, in Poland. The main focus is on the section dealing with the fight against doping in sport.

Cowan, D.-A.; Kicman, A.-T. (SIRC 453138)

**Doping in sport: Misuse, analytical tests, and legal aspects (editorial)
(Doping im Sport: Mißbrauch, analytische Tests und rechtliche Aspekte
(Editorial))**

Clin. Chem. Washington 43 (July 1997), 7; 1110-1113

Fritzweiler, J. (BISp 981236023)

**Ein § 299a StGB als neuer Straftatbestand für den sich dopenden Sportler?
(Section 299a in the penal code describing new facts constituting an offence
committed by athletes taking banned substances)**

SpuRt. Z. f. Sport u. Recht, München 5 (1998), 6; 234-235

Verf. zeigt eine bestehende Gesetzeslücke auf und unterbreitet den Vorschlag, den Sportwettbewerb und damit die faire Ausübung des Sports durch einen neu einzuführenden Straftatbestand im StGB zu sichern. Zu denken sei dabei an ein als Antragsdelikt ausgestaltetes abstraktes Gefährdungsdelikt. Antragsteller könne nur der geschädigte Mitkonkurrent sein, wobei der Breitensport von der strafrechtlichen Sanktion auszugrenzen sei. Denn der schutzwürdige kommerzielle Wettbewerb findet lediglich im Spitzenleistungssport mit dem Sportler als Unternehmer statt.

The author shows an existing gap in the law and proposes to secure fair sporting competitions by introducing new facts constituting an offence into the penal code.

Haas, U.; Prokop, C. (BISp 970726170)

Sind Staatsanwälte verpflichtet, gegen Doping-Ärzte Ermittlungsverfahren einzuleiten?

(Are public prosecutors legally obligated to initiate preliminary proceedings against doping doctors?)

SpuRt. Z. f. Sport u. Recht, München 4 (1997), 2; 56-59

Ohne die Mithilfe der Staatsanwaltschaft ist eine effektive Dopingbekämpfung nicht möglich, da insbesondere Ärzte, die Doping-Mittel zugänglich machen, dem Einflußbereich der Sportverbände entzogen sind. Die bei der Einleitung des Ermittlungsverfahrens auftretenden rechtlichen und tatsächlichen Probleme werden von Verf. aufgezeigt: 1. der Begriff des Dopings im strafrechtlichen relevanten Sinne; 2. der Tatbestandserfolg; 3. die Begehungsweise; 4. Abgrenzung zur eigenverantwortlichen Selbstgefährdung; 5. die Einwilligung als Rechtfertigungsgrund; 5. das Strafantragserfordernis. Sie kommen zu dem Ergebnis, daß die Staatsanwaltschaft bei zureichenden Anhaltspunkten verpflichtet ist, gegen mutmaßliche Doping-Ärzte ein Ermittlungsverfahren einzuleiten.

Without the aid of public prosecution an effective fight against doping is not possible because especially physicians making available banned drugs to athletes are outside the sphere of influence of the sport federations. The authors show the legal and factual problems of initiating preliminary proceedings and arrive at the conclusion that in the case of clear indications the department of public prosecution is legally obligated to initiate a preliminary investigation.

Heikkala, J. (SIRC 417684)

Perinteet vai pykalat: Liikunnan kansalaisyhteiskunnan oikeudellistuminen (Verbrechen und Strafe im Sport: Rechtssystem und Zivilrecht betreten fremden Boden – Was sagt das uns?/Crime and punishment in sports: Legal system and civil law are entering a foreign soil – what does it tell us)

Liikunta ja tiede, Helsinki 34 (1997), 2; 18-19

Ira-Fingerhood, M.; Tangney-Sullivan, J.; Testa, M.; Jasinski, D.R. (SIRC 416051)

Abuse liability of testosterone (Mißbrauchshaftung bei Testosteron)

J. of Psychopharmacol., Oxford 11 (1997), 1; 59-63

Krogmann, M. (BISp 990337693)

Zur Dopinggesetzgebung im Ausland – Teil 1 (Doping legislation in foreign countries – Part 1)

SpuRt. Z. f. Sport u. Recht, München 6 (1999), 1; 19-20

Verf. gibt einen Überblick über die verschiedenen gesetzlichen Lösungen des Dopingproblems in Großbritannien, Nordirland, Finnland und Belgien.

The author gives an overview of different legal solutions of the doping problem in Great Britain, Northern Ireland, Finland and Belgium.

Mestwerdt, Th. (BISp 980129528)

Notwendigkeit und verfassungsrechtliche Grundlage eines staatlichen Dopingsverbots

(Necessity and constitutional basis of a ban against doping issued by the state)

SpuRt. Z. f. Sport u. Recht, München 4 (1997), 4; 119-124

Immer neue Dopingskandale haben zu der Forderung nach staatlicher Unterstützung bei der Bekämpfung und Ahndung von Dopingverstößen geführt. Gedacht ist dabei an die Aufnahme von Strafbestimmungen in das StGB und die Aufnahme des Mißbrauchs von Dopingmitteln in das Arzneimittelgesetz. Verf. begrüßt diese Vorschläge insbesondere deshalb, weil sich das Dopingproblem längst auch in den Breiten- und Jugendsport verlagert hat. Angesichts der Autonomie des Sports bzw. seiner Organisationen in Deutschland und der Selbstbeschränkung des Staates auf die Sportförderung ist es aber fraglich, ob und woraus der Staat eine Legitimation zum Erlaß von Anti-Doping-Vorschriften herleiten könnte. Verf. äußert erhebliche Bedenken im Hinblick auf die verfassungsrechtlich garantierte Handlungsfreiheit des Einzelnen (Art. 2 I GG) und die Autonomie der Vereine und Verbände (Art. 9 I GG). Er erläutert, daß ein Anti-Doping-Gesetz auch nicht auf der staatlichen Schutzpflicht für die Gesundheit des Bürgers (Art. 2 II GG) fußen kann, da diese dem Gesetzgeber nicht das Recht gibt, den Einzelnen vor sich selber zu schützen. Der Staat kann daher die eigenverantwortliche Einnahme von Doping-Mitteln nicht verbieten oder gar unter Strafe stellen. Die Dopingbekämpfung bleibt insofern weiterhin alleinige Verantwortung der Sportverbände und einzelner Sportler.

Although the introduction of new provisions into the penal code would be ideal in view of the increasing number of doping scandals and the fact that the doping problem is extending into the area of mass and youth sport the state cannot forbid or even punish the intake of drugs at one's own risk. Therefore the fight against doping remains the sole responsibility of the sport federations and the individual athletes.

Mestwerdt, Th. (BISp 980531813)

**Doping – Sittenwidrigkeit und staatliches Sanktionsbedürfnis?
(Doping – violation of moral principles and the need of state sanctions?)**

Hamburg: W. Mauke Söhne, 1997. 221 pp., ISBN 3-923725-90-6

Nach einer einleitenden Bestimmung des Begriffs "Doping" zeigt Verf. in einem historischen Überblick die Dimensionen des Dopingmittelmisßbrauchs in der Vergangenheit beider deutschen Staaten auf. Anschließend werden Wirkungen und Nebenwirkungen der durch Sportverbände national und international verbotenen Dopingsubstanzen und die hieraus resultierenden Gesundheitsrisiken erläutert. Verf. macht in diesem Zusammenhang deutlich, daß insbesondere die Verabreichung von Dopingmitteln durch Dritte eine ganze Reihe von staatlichen Verbotsnormen erfüllt. Schwerpunktmäßig wird in der weiteren Darstellung diskutiert, ob die Einwilligung eines Sportlers in die Verabreichung eines Dopingmittels durch einen Dritten i.S.v. § 226a StGb unbeachtlich ist, weil hierin ein Verstoß gegen die "guten Sitten" zu sehen ist. Zur Beantwortung erfolgt eine Auseinandersetzung mit sportspezifischen Werten wie "Fairness" und "Chancengleichheit", in deren Verlauf sich die Frage stellt, ob in diesem Zusammenhang von allgemein anerkannten "sozialethischen Wertvorstellungen" gesprochen werden kann. Abschließend wird der Gedanke der Notwendigkeit eines Anti-Doping Gesetzes aufgegriffen, welches für eigenverantwortliches Doping durch den Sportler selbst Anwendung finden könnte. Dabei kommt der Reichweite des Art. 9 Abs. 1 GG, der dem Sport weitgehende Autonomie gewährt und staatliche Sanktionen zweifelhaft erscheinen läßt, eine besondere Bedeutung zu. Inso weit untersucht Verf., ob ein derartiges Gesetz möglicherweise aus dem in Art. 2 Abs. 2 GG verbrieften Schutz- und Fürsorgerecht für die Gesundheit der Bürger zu rechtfertigen ist.

The focus of the discussion is on the question whether the consent of the athlete to take banned drugs administered by a third party within the meaning of section 226a of the penal code is to be disregarded because it must be seen as a violation of moral principles. In order to give an answer to this question sport-specific values, as e.g. fairness and equality of chances, are discussed. The question arises whether one can speak of generally acknowledged social-ethical value concepts. Finally the idea of the necessity of an anti-doping law is taken up. Such a law could be applied to athletes taking banned drugs at their own risk.

OLG Dresden (BISp 980733194)

**Kein Schadenersatz wegen Dopings in der ehemaligen DDR
(No compensation for damage caused by doping in the former GDR)**

Dt.-dt. Rechts-Z., München 8 (1997), 9; 291-294

Das Urteil befaßt sich mit der Frage, ob Ärzte, die in der DDR für das Doping von Leistungssportlern verantwortlich waren, und die Bundesrepublik Deutschland als Rechtsnachfolger der DDR, solchen Sportlern zum Schadenersatz verpflichtet sind. Das OLG Dresden lehnt die Schadenersatzpflicht in beiden Fällen ab. Für die Haftung der Sportärzte ist nach Art. 232 § 1 EGBGB weiterhin das DDR-Recht anzuwenden. Dieses beinhaltet aber nicht die persönliche Haftung von Personen, die in Ausübung staatlicher Tätigkeit oder in Erfüllung ihnen obliegender betrieblicher Aufgaben handelten. Bezüglich der Haftung der Bundesrepublik Deutschland verneint das OLG die notwendige Rechtsnachfolge für die betreffenden Verbindlichkeiten der DDR. Weder habe die Bundesrepublik sämtliche Verbindlichkeiten der DDR übernommen, noch habe sie die Einzelrechtsnachfolge für die betreffenden Verbindlichkeiten angetreten. Dies wird mit einer eingehenden Untersuchung der Vorschriften des Einigungsvertrages begründet.

The judgement presented in this article deals with the question whether physicians who were responsible for doping high-performance athletes in the former GDR and the Federal Republic of Germany as legal successor of the GDR are liable to pay damages to such athletes. The Regional Appeal Court in Dresden declined the liability to pay damages in two cases.

OLG Dresden (BISp 980129536)

**Schadenersatz wegen Verabreichung von Doping
(Compensation for damage caused by the administration of doping
substances)**

SpuRt. Z. f. Sport u. Recht, München 4 (1997), 4; 132-134

In der DDR wurde Doping vom Staat zentral verordnet und systematisch zur Erreichung sportlicher Höchstleistungen eingesetzt. Das OLG Dresden hatte in diesem Fall über die Klage eines betroffenen Sportlers gegen die verantwortlichen Ärzte sowie die Bundesrepublik Deutschland als Rechtsnachfolger der DDR zu entscheiden. Es hat die geltend gemachten Schadenersatzansprüche mit der Begründung abgelehnt, die Ärzte hätten entweder in Ausübung staatlicher Tätigkeit oder als Arbeitnehmer gehandelt. Nach dem anzuwendenden DDR-Recht sei ihre persönliche Einstandspflicht in beiden Fällen ausgeschlossen. Ansprüche gegen die Bundesrepublik Deutschland bestehen nicht, weil diese nicht die Universalrechtsnachfolge der DDR angetreten hat, und auch nicht die Rechtsnachfolge speziell bezüglich der betroffenen Verbindlichkeiten der DDR vertritt.

In the GDR the administration of doping substances was decreed by the state and used systematically for reaching top performances. The Regional Appeal Court in Dresden had to decide the action of an athlete affected against the physicians responsible as well as against the Federal Republic of Germany as the legal successor of the GDR. The court declined the claim for compensation on the grounds that the physicians had acted in exercise of state activity or as employees. According to the applicable GDR law personal liability of the physicians for damages was excluded. The court also stated that there were not any claims against the Federal Republic of Germany either because this state was neither the universal nor the specific legal successor of the GDR.

Prokop, C. (BISp 981135524)

**Änderung der Doping-Regeln der IAAF
(Change of the IAAF doping regulations)**

SpuRt. Z. f. Sport u. Recht, München 5 (1998), 1; 24-25

Auf dem 41. Kongreß des Weltleichtathletik-Verbandes IAAF (1997 in Athen) wurden wesentliche Änderungen der Dopingregeln beschlossen. Hintergrund war die Erkenntnis, daß der Versuch, Doping ausschließlich durch drastische Strafen zu bekämpfen, fehlgeschlagen ist. Zahlreiche nationale Gerichte haben die vorgesehene vierjährige Sperre bei Dopingverstößen für unzulässig erklärt. In diesem Fall kann nun die IAAF selbst tätig werden. Die neuen Regeln sehen eine zweijährige Sperre beim ersten Verstoß und eine lebenslängliche beim zweiten vor. Bei der Einnahme sogenannter Stimulantien ist nun zunächst eine öffentliche Verwarnung vorgesehen. Es existierte auch eine Regelungslücke für den Fall, daß ein nationaler Verband trotz Dopingverdachts untätig blieb.

Starting from the fact that numerous national courts had declared the planned ban of four years as bar to execution important changes of the doping regulations were adopted at the 41st IAAF congress in Athens in 1997. According to the new regulations there is a ban of two years in the case of a first contravention of the doping regulations and a lifelong ban in the case of a second contravention. Athletes who have been proved guilty of having taken so-called stimulants will first be warned.

Reeb, M. (SIRC S-13419)

**General principles of CAS case law in doping issues
(Allgemeine Prinzipien des CAS-Fallrechts in Dopingangelegenheiten)**

Olymp. Rev., Lausanne 26 (February/March 1998), 19; 67-68

Röthel, A. (BISp 990337696)

**Neues Doping-Gesetz für Frankreich
(New doping law for France)**

SpuRt. Z. f. Sport u. Recht, München 6 (1999), 1; 20-21

Verf. skizziert den jüngsten Entwurf für ein neues Anti-Doping-Gesetz, durch das der französische Staat sein Engagement im Kampf gegen Doping deutlich intensiviert und einen weiteren Schritt zur hoheitlichen Regulierung des Sports getan hat. Der Schwerpunkt der Änderungen liegt im Bereich der Verfahrensvorschriften. Neben den allgemeinen Überwachungsmaßnahmen (Lizenz; Sportpaß) werden disziplinarische sowie strafrechtliche Repressionen des Dopings erläutert. Aufgrund der gewachsenen Staatsferne des Sports und seiner Selbstregelungsstrukturen lehnt Verf. eine vergleichbare Regelung in Deutschland

ab.

The author presents the latest draft of a new anti-doping law issued by the French government in order to intensify its fight against doping and to take a further step toward the national regulation of sport. The focus of the changes is on the rules of procedure. Apart from the general measures of supervision (license; sport pass) disciplinary and penal repressions of doping are explained. The author is against a comparable regulation in Germany because of the increased independence of the sport system and its structures of self-regulation.

Schlund, G.H. (BISp 980531812)

**Rechtliche Aspekte des Arzneimittelmißbrauchs
(Legal aspects of drug abuse)**

Dt. Ärztebl., Cologne 95 (1998), 16; B-779-B-781

Die Frage, ob ein Arzt einem Bodybuilder Anabolika verordnen darf, muß man wie folgt beantworten: Solche Präparate kann und darf der Arzt durchaus seinem Patienten verordnen, unabhängig davon, ob er (daneben auch noch) Bodybuilding betreibt oder nicht. Nur muß für eine solche Verordnung eine strenge medizinische Indikation bestehen. Die evtl. strafrechtlichen Folgen für den Arzt, die ihm aus einer Dopingmittelverschreibung entstehen können, werden dargestellt.

The question whether a physician is allowed to prescribe anabolic steroids to a body builder can be answered as follows: A physician is allowed to prescribe such preparations to a body builder regardless whether the patient does body building or not. However, such a prescription must be based on a strict medical indication. Possible penal consequences for the physician resulting from prescribing anabolic steroids are discussed.

Tarasti, L. (BISp 981034468)

**Liability of the athlete in doping
(Die Haftung des Sportlers im Fall von Doping)**

New Stud. in Athletics, Monaco 13 (1998), 1; 7-10

In criminal law strict liability is understood as liability without intent or negligence. The question dealt with in this article is what kind of meaning strict liability has in doping cases and if it is possible in these cases to deviate from the general principles of criminal law when determining guilt and the necessary intent or negligence. All problems as for liability concern the case where a prohibited substance is found to be present within an athlete's body tissue or fluids. Already the rule itself refers to strict liability. It is not a question of what an athlete has done or taken, but only that the sample provided from him or her has consisted of a prohibited substance. The author points out that the rule "a prohibited substance is found to be present within an athlete's body tissue or fluids" is mainly a rule concerning the burden of proof. The rule shows that when a prohibited substance has been found the burden of proof will move to the athlete concerned. It is then the athlete's task to show that no doping offence has taken place. When the burden of proof has turned to the athlete, it is today very difficult for him or her to claim credibly to be not guilty by avoiding any negligence. The strict interpretation of the athlete's duty to be careful and to avoid negligence covers nearly all doping cases. Although the Arbitration Panel of the IAAF has so far never made strict liability in the sense of criminal law the real basis for its decisions, the Panel has interpreted an athlete's liability for his or her negligence severely and has not accepted various

explanations as sufficiently credible to show that the burden of proof has been fulfilled.

Vieweg, K. (BISp 990136586)

Rechtsprobleme des Dopings

(Legal problems in connection with doping)

Leistungssport, Münster 29 (1999), 1; 29-31

Sport und Recht hatten lange Zeit nur wenige gemeinsame Berührungspunkte und existierten separat nebeneinander. Mit der teilweise dramatischen Veränderung des sozialen, politischen und wirtschaftlichen Stellenwerts des Sports hat sich seit Anfang der 70er Jahre auch seine Beziehung zum Recht gewandelt. Insbesondere die Dopingproblematik hat ihren Niederschlag in der Rechtsprechung gefunden. Aus dem breiten Spektrum juristischer Fragen zur Dopingproblematik werden mögliche Mittel der Dopingverhinderung aus juristischer Sicht sowie Fragen des Rechtsschutzes thematisiert.

For a long time there were only few points of contact between sport and law, they were two separate areas. Together with the partly dramatic changes of the social, political and economical status of sport there has also been a change of the relationship between sport and law from the beginning of the seventies on. Especially the problem of doping has been the subject of court decisions. From the broad spectrum of legal questions concerning the problem of doping possible means to prevent doping as well as questions of legal protection are dealt with.

Vieweg, K. (Hrsg./Ed.) (BISp 990337747)

Doping. Realität und Recht. Internationales Symposium am 4. und 5. 7. 1997 in Erlangen

(Doping. Reality and the law. International symposium in Erlangen on July 4 to 5, 1997)

Berlin: Dunker & Humblot, 1998. 420 pp., ISBN 3-428-09570-7 = Beiträge zum Sportrecht; Bd. 1

Aus dem Inhalt: 1. Vieweg, K.: Grundinformationen zur Dopingproblematik. 2. Hollmann, W.: Zum Doping aus sportmedizinischer Sicht. 3. Schänzer, W.: Neuere Entwicklungen in der Dopinganalytik. 4. Brüggemann, G.P.: Mögliche Langzeiteffekte des Dopings aus biomechanischer Sicht. 5. Kühl, K.: Zur strafrechtlichen Relevanz sportethischer Beurteilung des Dopings. 6. Tettinger, P.J.: Die Dopingproblematik im Lichte der europäischen Grundrehtediskussion. 7. Vieweg, K.: Dopingvermeidung und Verbandsrecht – Regelkreismodell, Ergebnisse und Analyse einer explorativen Erhebung. 8. Walker, W-D.: Beweisrechtliche und arbeitsrechtliche Probleme des Dopings. 9. Vrijman, E.N.: Auf dem Weg zur Harmonisierung: Ein Kommentar zu aktuellen Aspekten und Problemen. 10. Netzle, St.: Wie hält es das Internationale Sportschiedsgericht mit dem Doping? 11. Silance, L.: Dopingkontrolle in Belgien. 12. Lüschen, G.;Lüschen, L.S.: Die Struktur des Dopings im Sport, seine rechtliche und soziale Kontrolle – Eine vergleichende Untersuchung über Frankreich und die USA. 13. Szwarc, A.J.: Dopingrecht in Polen. 14. Baddeley, M.: Athletenrechte und Doping aus der Sicht des schweizerischen Rechts. 15. Bailey, D.: Doping Control in the United Kingdom – The Regulatory and Legal Framework. 16. Bette, K-H.; Schimank, U.: Doping und Recht – soziologisch betrachtet. 17. Wagner, G.: Eine einfache Möglichkeit zur anreizgesteuerten Dopingbekämpfung im Hochleistungssport – Theoriegeleiteter Vorschlag und empirische Evidenz.

Apart from some articles dealing with general, biochemical, medical and biomechanical aspects of doping this book includes mostly articles on various legal aspects of doping in different European countries.

5. Beiträge zum Doping bei Jugendlichen / Articles about doping with youth athletes

Anderson, S.J.; Bolduc, S.P.; Coryllos, E.; Griesemer, B.; McLain, L.; Rowland, T.W.; Tanner, S.M.; Keely, K.; Malacrea, R.; Young, J.C.; Washington, R.L.; Reed, F.E.; Bar-Or, O.; Risser, W.L. (SIRC 450500)

Adolescents and anabolic steroids: A subject review (Heranwachsende und anabole Steroide: Ein Themenüberblick)

Pediatrics, Elk Grove Village (Ill.) 99 (1997), 6; 904-908

This revision of a previous statement by the American Academy of Pediatrics provides current information on anabolic steroid use by young athletes.

DuRant, R.H.; Middleman, A.B.; Faulkner, A.H.; Emans, S.J.; Woods, E.R. (BISp 980129367)

Adolescent anabolic-androgenic steroid use, multiple drug use, and high school sports participation

(Konsum androgen-anaboler Steroide, multipler Drogenkonsum und Teilnahme am High-School-Sport bei Jugendlichen)

Pediatr. Exerc. Sci., Champaign (Ill.), 9 (1997), 2; 150-158

The purpose of this study was to examine the relationships among anabolic-androgenic steroid use and other drug use, strength training, sports participation, and school performance of high school students. Among males not participating in school sports, 37% of the variation in anabolic steroid use was accounted for by frequency of cocaine use, injected drug use, other drug use, and engaging in strength training. Injection drug use and poly-drug use accounted for 22.1% of the variation in the frequency of anabolic-steroid use among males participating in school sports, 29.1% of the variation among females participating in school sports, and 63.3% of the variation among females not participating in school sports.

Franchini, F.; Calabri, G.B.; Casini, T.; Cocchi, P. (SIRC 481836)

L'abuso di sostanze anabolizzanti nell'adolescente che fa sport (Mißbrauch anaboler Substanzen durch sporttreibende Jugendliche/The abuse of anabolic drugs by adolescents playing sport)

Pediatrica med. & chirurg., Vicenza (Italy) 20 (1998), 3; 219-221

Nutter, J. (BISp 970423742)

Middle school students' attitudes and use of anabolic steroids (Einstellung zu und Konsum von anabolen Steroiden bei Mittelschülern)

J. of Strength & Condit. Res., Lincoln (Nebr.), 11 (1997), 1; 35-39

Little is known about the nature and extent of the problems related to anabolic steroid use among young adolescents. A survey was administered to 265 middle school students (M age 13.3±0.8 yrs) to determine their attitudes toward and use of anabolic steroids. In all, 5.3% of the boys and 1.5% of the girls reported anabolic steroid use. Among non-users, 7% said they had been offered the drugs, 24% knew where to obtain them, 10% were uncertain about future use, and 3% stated they might use them. Approximately 20% of non-users were uninformed about the

side effects of anabolic steroids, and 11% believed they were not harmful if used carefully. Although preliminary, these results suggest the problem of anabolic steroid use extends to very young adolescents and that there is a need to implement educational interventions for this population.

Paruit, D.M.C. (BISp 990639886)

Prévention du dopage chez l'enfant sportif

(Dopingprävention bei jungen Sportlern/Prevention of doping among young athletes)

Cinésiologie, Paris 36 (May/August 1998), 179-180; 133-134

The author discusses various aspects of doping and doping prevention in children's and youths' sport mainly from the point of view of ethics.

Walter, S.M. (SIRC 450330)

Examining the effects of drug testing on drug use at the secondary education level

(Untersuchung der Auswirkungen von Drogentests auf den Drogenkonsum bei Sekundarstufenschülern)

Microform Publications, Int'l Inst for Sport & Human Performance, University of Oregon, Eugene, Ore, 1997, 2 microfiches (104 fr.)

The primary purpose of this study was to determine if a drug testing program could impact or change student drug use at the secondary education level. Secondary purposes were to 1) assess the perceptions of secondary education students toward licit and illicit drugs, drug use, and the newly implemented drug testing program, and 2) to examine why drug use may continue even after a drug testing program has been implemented. Data was collected through the use of questionnaires, discussion groups, and one-on-one interviews. Examination of the questionnaire data indicated that student drug use was not substantially deterred by the newly implemented drug testing program over a three to four month time period. Also, students' perceptions of the newly implemented drug testing program were mainly that of disagreement. Students commented that they felt the drug testing policy was implemented to "catch them" using drugs rather than "help them" with a possible drug addiction. One of the main reasons that the drug testing program did not have a great deterrent effect on student drug use, as suggested by the students, was that the odds were not high enough that they would be selected to be drug tested. In some instances, drug testing was not proving to be a deterrent to drug use, but rather a deterrent to participation in school activities. However, for some students, drug testing was proving to be a deterrent to drug use. As quoted from one of the discussion group members: "It's a step in the-right direction."

Yesalis, C.E.; Barsukiewicz, C.K.; Kopstein, A.N.; Bahrke, M.S. (SIRC 461400)

Trends in anabolic-androgenic steroid use among adolescents

(Trends der Anwendung anabol-androgener Steroide bei Heranwachsenden)

Arch. of Pediatrics & adolesc. Med., Chicago 151 (1997), 12; 1197-1206

6. Artikel zu ethischen Aspekten des Dopings im Sport / Articles dealing with ethical aspects of doping in sport

Berteau, P. (BISp 981034739)

Médecine, sport et éthique

(Medizin, Sport und Ethik/Medicine, sport and ethics)

Sci. et Sports, Paris, 13 (1998), 4; 188-192

The French Sports Medicine Society met with a commission in charge of exercise and relationship problems concerning sports medicine practice. Members discussed exercise independence, medical exercise, doping (with both aspects regarding ethic philosophy and athlete's integrity), AIDS, sports practice by young athletes, sports medicine research and relationship between sport's doctors, athletes and their surroundings. Ethics regarding sports medicine, is essentially the same as in general medical approach.

Burke, M.D.; Roberts, T.J. (SIRC 457187)

Drugs in sport: An issue of morality or sentimentality?

(Pharmaka im Sport: Eine Frage der Moralität oder Sentimentalität?)

J. of the Philos. of Sport, Champaign (Ill.) 24 (1997), 99-113

Gallien, C.L. (SIRC S-17934)

Dopage et éthique sportive

(Doping und Sportethik/Doping and sports ethics)

FISU magazine, Bruxelles 41 (September 1998), 48-51

Hart, L.E.; Pipe, A.L. (SIRC 411323)

Enhancing athletic performance: When ethics and evidence clash (editorial)

(Steigerung der sportlichen Leistung: Wenn Ethik und Beweis aufeinanderprallen (Editorial))

Clin. J. of Sport Med., Hagerstown (Md.) 7 (January 1997), 1; 1-2

Krüger, A. (BISp 980733225)

Doping im Spitzensport

(Doping in top-level sport)

Leistungssport, Münster 28 (1998), 4; 11-13

Verf. berichtet von einer Tagung der Amateur Athletic Foundation of Los Angeles im April 1998 zu ethischen, rechtlichen, sportlichen und sozialen Problemen des Dopings im Spitzensport. Die Diskussion fand an der Schnittstelle von naturwissenschaftlichen und sportpraktischen Kenntnissen statt und zeigte vor allem die Widersprüchlichkeiten und Verhaltensinkonsistenz im Zusammenhang mit Dopingverbot und -kontrolle anhand der Schlüsselbegriffe bzw. -themen "Gesundheitsschutz", "Chancengleichheit", "ethischer Anspruch".

The meeting of the Amateur Athletic Foundation of Los Angeles in April 1998 dealt with ethical, legal, and social problems of doping in top-level sport. The discussion took place at the interface between scientific findings and the reality of sport practice and revealed inconsistencies regarding the key concepts of health protection, equality of chances and ethical claims.

Manara, I. (SIRC 416676)

Medicina e doping nello sport: Implicazioni etico-deontologiche

(Medizin und Doping im Sport: Ethisch-deontologische Aspekte (Editorial)/

Medicine and doping in sports: Ethical-deontologic implications (editorial))

Minerva med., Torino 88 (January/February 1997), 1/2; 1-7

Ottoz, E. (SIRC 481733)

Doping: Paradosso dell'etica o etica del paradosso?

(Doping: Paradoxon der Ethik oder die Ethik des Paradoxons?/Doping: Paradox of ethics or ethics of paradox?)

Atleticastudi, Roma 28 (May/June 1997), 3; 24-28

Schneider, A. (BISp 980934297)

**Doping-Kontrolle: Eine ethische Analyse aus kanadischer Sicht
(Doping control: An ethical analysis from the Canadian point of view)**

Leistungssport, Münster 28 (1998), 5; 38-41

Trainingsbegleitende Dopingkontrollen beeinträchtigen die Persönlichkeitsrechte von Sportlerinnen und Sportlern. Aus kanadischer Perspektive werden die unterschiedlichen Argumente für solche Kontrollen überprüft. Da der Eingriff in Persönlichkeitsrechte unzulässig ist, argumentiert Verf., daß die Trainingskontrollen in die Hände der Sportler selbst gelegt werden und mit allen technologischen Möglichkeiten ausgestattet werden müssen, während die Verbände weiter die Wettkampfkontrollen betreiben sollen.

In-training doping tests interfere with the personality rights of athletes. From the Canadian point of view the different arguments for such tests are examined. As the interference with personality rights is inadmissible, the author argues that in-training doping tests should be carried out by the athletes themselves; they must therefore be provided with adequate technological equipment. The federations should continue to carry out in-competition tests.

7. Publikationen zu allgemeinen oder unterschiedlichen Aspekten des Dopings im Sport / Publications dealing with general/various aspects of doping in sport

Balant, L.P.; Balant-Gorgia, E.A. (SIRC S-21039)

**Sport and medication misuse
(Medikamentenmißbrauch im Sport)**

J. of Subst. Misuse, Kent (England) 3 (1998), 1; 10-12

Bird, E.-J.; Wagner, G.-G. (SIRC 458935)

**Sport as a common property resource: A solution to the dilemmas of doping
(Sport als Gemeineigentumsressource: Eine Lösung des Doping-Dilemmas)**

J. of Conflict Resolution, Thousand Oaks (Calif.) 41 (December 1997), 6; 749-766

Black, T.; Pape, A. (BISp 980430893)

**The ban on drugs in sports – The solution or the problem?
(Das Dopingverbot im Sport – Die Lösung oder das Problem?)**

J. of Sport & soc. Issues, Thousand Oaks (Cal.), 21 (1997), 1; 83-92

This article analyses the ban on drugs in sport from a market perspective. It argues that the ban can only be justified if the following three requirements are fulfilled. (a) There must be a persistent and widespread problem with the market solution, (b) the introduction of a ban must be able to reduce the market problem, and (c) the value of resources used up enforcing the ban must be less than the value of resources used up by the market problem. The evidence presented suggests that there is not a problem with the market. It is demonstrated that in the absence of a ban on drugs, fair contests result because any advantage gained from taking drugs is competed away. It is also concluded that the removal of the ban would improve athletes' health because they could have access to medical advice and supervision. The authors conclude that the ban is not justified.

den-Duyn, N. (SIRC 420870)

Drugs in sport: Are our coaches educated?

(Pharmaka im Sport: Sind unsere Trainer diesbezüglich ausgebildet?)

Sport Educator, Canberra 9 (June 1997), 2; 28-29

Elliot, D.L.; Goldberg, L.; Wolf, S.L.; Moe, E.L. (BISp 990337816)

Coaches' estimates of drug use and disordered eating: A blind spot?

(Die Einschätzungen des Dopingmitteleinsatzes und von Eßstörungen durch Trainer: Ein blinder Fleck?)

Nat. Strength & Condit. Assoc. J., Lincoln (Nebr.) 20 (1998), 3; 53-56

Disordered eating is a significant health problem among young women, and according to cross-sectional studies these problems are most prevalent among women athletes. In addition to disordered eating, female athletes may use physique altering drugs to control their weight or enhance their sport performance. When assessed, approximately 25% of college women athletes used diuretics, 16% reported laxative abuse, and 1% took anabolic steroids. Inadequate nutrition, purging, and use of weight loss / physique altering agents can increase injuries and reduce bone mass. The most severe forms can be fatal. Determining the prevalence of these problems and the educational needs of coaches and athletes is a first step toward designing a program to determine these unhealthy behaviors. Targetting that objective, the authors surveyed coaches of female high school athletes about their players' use of physique altering drugs and disordered eating behaviors, as well as the coaches' own knowledge of sport nutrition and strength training. The findings shed light on how coaches view their players' harmful health behaviors.

Ferstle, J. (SIRC 494061)

Drug scandals pervade Olympic sports: Could running be next?

(Dopingskandale verseuchen den olympischen Sport: Könnte das Laufen als nächstes an der Reihe sein?)

Road Race Managem., Bethesda (Md.) (August 1998), 193; 3, 8

Fischetto, G. (SIRC 481731)

La ricerca condotta dal settore sanitario della FIDAL sull'uso di farmaci da parte degli atleti italiani

(Die Forschung der medizinischen Abteilung von FIDAL hinsichtlich des Einsatzes von Dopingmitteln durch italienische Sportler/The research of the medical department of the FIDAL on the drugs use in Italian athletes)

Atleticastudi, Rome 28 (May/June 1997), 3; 19-22

Gallien, C.L. (SIRC 410779)

Dopage et lutte anti-dopage

(Doping und der Antidoping-Kampf/Doping and the fight against doping)

Educ. phys. et Sport, Paris 47 (January/February 1997), 263; 38-40

Gallien, C.-L. (SIRC S-22443)

Le dopage en questions

(Fragen zum Doping/Questions about doping)

Educ. phys. et sport, Paris 49 (January/February 1999), 275; 40-41

Greenway, P.; Greenway, M. (BISp 980128899)

General practitioner knowledge of prohibited substances in sport

(Das Wissen von Allgemeinmedizinern über verbotene Substanzen im Sport)

Brit. J. of Sports Med., Loughborough 31 (1997), 2; 129-131

Objectives: To assess general practitioner knowledge of banned substances in sport.
Methods: Postal questionnaire sent to all general practitioners in West Sussex. Results: Only 55 (35%) of those who responded (157 in total) were aware that guidelines are to be found in the British National Formulary, and 19 (12%) of respondents believed that medical practitioners are allowed to prescribe anabolic steroids for non-medical reasons.
Conclusions: General practitioner knowledge of which substances are prohibited in sports is poor. There is a lack of awareness of Sports Council guidelines which are to be found in the British National Formulary. Tackling drug abuse in sport requires education of both athletes and doctors.

Kidane, F. (BISp 990639936)

**Doping and developing countries
(Doping und Entwicklungsländer)**

Olymp. Rev., Lausanne 26 (August/September 1998), 22; 5-6

Drug consumption by young people is spreading very rapidly in developing countries. The risk of doping becoming internationalized is omnipresent. It is estimated that there are some 1.3 thousand million young people in the world today, the majority of whom live in developing countries. It is therefore recommended that preventive campaigns be conducted at every level in order to protect the health of the young people.

Kurz, D.; Mester, J. (Eds.) (BISp 980229731)

**Doping im Sport – zwischen biochemischer Analytik und sozialem Kontext.
Symposium Köln, 4. Nov. 1995, in memoriam Prof. Dr. Manfred Donike**

(Doping in sport – between biochemical analytics and social context. Symposium in Cologne, Nov. 4, 1995, in memory of Prof. Dr. Manfred Donike)

Cologne: Sport & Buch Strauß, 1997. 95 pp., ISBN 3-89001-047-4

Der moderne Leistungs- und Spitzensport ist einer Reihe großer Gefahren ausgesetzt. Dazu gehört die Überkommerzialisierung, die vielfach in erheblicher Weise bereits jetzt in das Wettkampfgeschehen eingreift und mit Mitteln der mediengerechten Vermarktung den Sport häufig in die Nähe reiner Show-Veranstaltungen rückt. Millionenverdienste einzelner Sportlerinnen und Sportler erwecken dabei den Eindruck, als ob der Leistungssport solche Verdienste in seiner ganzen Breite ermöglicht. Eine weitere, sehr ernst zu nehmende Gefahr besteht darin, daß die Leistungsdichte in den meisten Sportarten in den vergangenen Jahren außerordentlich gewachsen ist. Heute entscheiden geringste Leistungsunterschiede über Sieg oder Niederlage. Vor diesem Hintergrund ist es nicht verwunderlich, daß der Mißbrauch medikamentöser Unterstützung der Leistungsfähigkeit in vielen Situationen erheblich zugenommen hat. Die tieferen Ursachen des Doping-Unwesens sind zweifellos in einem größeren Zusammenhang zu sehen. Eine Hoffnung auf die o.g. Millionenverdienste muß hier nicht immer im Vordergrund stehen. Das Verlangen nach körperlicher Höchstleistung selbst kann durchaus auch zu einem suchtvähnlichen Verhalten führen, das vor dem Gebrauch hochgefährlicher Substanzen nicht zurückschreckt. Kommt, wie im eigentlichen Drogenmilieu, ein entsprechendes soziales Umfeld hinzu, vergrößern sich die Gefahren weiter. Während die biochemische Analytik in den letzten Jahren bei der Nachweisbarkeit von Doping-Substanzen große Erfolge zu verzeichnen hatte, ist über die vielfältige Verstrickung von anderen Gründen für Doping-Mißbrauch relativ wenig bekannt. Der Club of Cologne hat es sich deshalb zur Aufgabe gemacht, den Kontext von psychischen und sozialen Hintergründe in den Zusammenhang mit der klassischen biochemischen Analytik zu stellen und zu erforschen. (Vorwort). Der vorliegende Symposiumsbericht enthält folgende Beiträge: Der aktuelle Stand der Doping-Analytik (Schänzer, W.); Ergogene Hilfen: Doping oder Substitution? – Problematisiert am Beispiel der Kreatin-Supplementation (Heck, H. / Schulz, H.); Trends

bei NSAD's und Analgetika: Doping oder Therapie? (Müller, R.K.); Sporterziehung und Drogenaufklärung in der Jugend als Maßnahmen einer frühen Anti-Doping-Edukation (Kurz, D.); Ethik und Moral als Legitimationsquellen im Kampf gegen das Doping? (Gebauer, G.); Nationale und internationale Gerichtsbarkeit: Probleme, Widersprüche und Lösungsmöglichkeiten (Tarasti, L.); Doping aus der Sicht der Aktiven: Zwischen dem Wunsch zur "sauberen" Leistung und öffentlichen Pressionen (Grabow, V.).

Contents: The current state of doping analysis (Schänzer, W.); Ergogenic aids: doping or substitution? Discussed on the basis of creatine supplementation (Heck, H. / Schulz, H.); Trends concerning NSADs and analgetics: doping or therapy? (Müller, R.K.); Sport education and drug education of young people as measures of an early anti-doping-education (Kurz, D.); Ethics and moral as legitimation sources in the fight against doping? (Gebauer, G.); National and international jurisdiction: problems, inconsistencies and possibilities of solution (Tarasti, L.); Doping from the athletes' point of view: between the wish for "clean" performances and public pressure (Grabow, V.).

Merode, A. de (BISp 990639940)

Doping: Seeking the causes

(Die Suche nach den Ursachen für Doping)

Olymp. Rev., Lausanne 26 (October/November 1998), 23; 5-8

Today, in parallel with the fabulous benefits that high-level sport brings to its practitioners, their entourages, the sponsors and the politicians who support them, a point has been reached at which, thanks in particular to physiology, a form of scientific cheating in competition has become programmed. While denaturing the "human material", alternating overtraining with the use of carefully dosed medicinal preparations, the "gurus" of scientific doping have claimed to treat patients who were not really sick, because a simple reduction in the intensity of their training, without the use of complex chemistry, would have led to a return to a normal state. Worse still, some legislative acts, established with the laudable aim of protecting athletes' health, have in fact legalized particular forms of doping by setting threshold levels beyond which competition is forbidden, but within which the use of products that remain undetectable today is perfectly authorized.

No author (SIRC S-13193)

Doping

Olymp. Rev., Lausanne 26 (April/May 1997), 14; 51-53

Pai, S. (BISp 981235790)

Drugs and sport

(Pharmaka und Sport)

Sports Exerc. & Injury, Edinburgh 4 (1998), 2/3; 93-96

In the struggle for an athlete to gain the 'higher ground' above the rest of the competitors there has always been the temptation to take prohibited substances which allow goals to be attained easier than the conventional training methods. The problem of drugs in sport has existed for a long time and is underestimated in its prevalence. This paper deals with the reasons why athletes take such drugs, which drugs are available and the testing employed to detect their use. Among the issues discussed will be the future of drugs in sport and what measures can be taken to combat such a problem.

Pan, W.D.; Baker, J.A. (BISp 980632589)

Perceptual mapping of banned substances in athletics: Gender- and sport-defined differences

(Auf der Wahrnehmung beruhende Registrierung im Sport verbotener Substanzen: Geschlechts- und sportlich definierte Unterschiede)

J. of Sport & soc. Issues, Thousand Oaks (Cal.), 22 (1998), 2; 170-182

A multidimensional scaling approach was used to investigate the differential positions of 16 banned substances relative to selected attributes as perceived by student athletes. Four factors dictating respondents' preference were extracted using a factor analysis. Differences in perceptions as defined by gender and contact versus non-contact sports were compared to identify those banned substances to which student athletes were most vulnerable. Besides alcohol, caffeine, and anabolic steroids, the results revealed that marijuana, crank/speed, heroin, and LSD/ecstasy were popular among male student-athletes, and uppers/amphetamines, and morphine among female student-athletes. Marijuana, cocaine/crack, and heroin were given a special preference in contact sports, whereas marijuana and crank/speed were preferred in non-contact sports. The results could help the development of targeted drug policies and education programs to curb the potential use of banned substances in athletics.