

Mass Spectrometry In Sports Drug Testing Characterization Of Prohibited Substances And Doping Control Analytical Assays

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The purpose of the book is to introduce platelets, and their functional role in thrombotic and cardiovascular disease, justifying the relevance of platelet proteomics research. Focus then shifts to the recent developments on mass spectrometry (MS)-based proteomics. This chapter shows potential applications for platelet proteomics not yet carried out. It includes examples of post-translational modifications (PTMs) analysis in platelets. The second part of the book focuses on the main research done so far on platelet proteomics. This includes general proteome mapping by non-gel based separation methods (MudPit), analysis of the general platelet proteome and signaling cascades by gel-based separation methods (2-DE), sub-proteome analyses (secretome/releasate, membrane proteins, organelles). Finally, the last section links the platelet transcriptome and application to disease. This section is highly relevant and includes chapters on proteomics, transcriptomics, functional genomics, systems biology, and their applications to platelet-related diseases.

Volume 9: Historical Perspectives, Part A: The Development of Mass Spectrometry of The Encyclopedia of Mass Spectrometry describes and analyzes the development of many aspects of Mass Spectrometry. Beginning with the earliest types of Mass Analyzers, Historical Perspectives explores the development of many different forms of analytical processes and methods. The work follows various instruments and interfaces, to the current state of detectors and computerization. It traces the use of Mass Spectrometry across many different disciplines, including Organic Chemistry, Biochemistry, and Proteomics; Environmental Mass Spectrometry; Forensic Science; Imaging; Medical Monitoring and Diagnosis; Earth and Planetary Sciences; and Nuclear Science. Finally, the book covers the history of manufacturers and societies as well as the professionals who form the Mass Spectrometry community. Also available: Volume 9: Historical Perspectives, Part B: Notable People in Mass Spectrometry briefly reviews the lives and works of many of the major people who carried out this development. Preserves the history and development of Mass Spectrometry for use across scientific fields Written and edited by Mass Spectrometry experts Coordinates with Volume 9: Historical Perspectives, Part B: Notable People in Mass Spectrometry, a collection of short biographies on many of the major people who carried out this development

An insightful exploration of the key aspects concerning the chemical analysis of antibiotic residues in food The presence of excess residues from frequent antibiotic use in animals is not only illegal, but can pose serious health risks by contaminating products for human consumption such as meat and milk. Chemical Analysis of Antibiotic Residues in Food is a single-source reference for readers interested in the development of analytical methods for analyzing antibiotic residues in food. It covers themes that include quality assurance and quality control, antibiotic chemical properties, pharmacokinetics, metabolism, distribution, food safety regulations, and chemical analysis. In addition, the material presented includes background information valuable for understanding the choice of marker residue and target animal tissue to use for regulatory analysis. This comprehensive reference: Includes topics on general issues related to screening and confirmatory methods Presents updated information on food safety regulation based on routine screening and confirmatory methods, especially LC-MS Provides general guidance for method development, validation, and estimation of measurement uncertainty Chemical Analysis of Antibiotic Residues in Food is written and organized with a balance between practical use and theory to provide laboratories with a solid and reliable reference on antibiotic residue analysis. Thorough coverage elicits the latest scientific findings to assist the ongoing efforts toward refining analytical methods for producing safe foods of animal origin. Doping in sports and the fight against it has gained increasing attention in recent years. The pharmacological basis for a possible performance enhancement in competitive sport through the administration of prohibited substances and methods as well as the analytical disclosure of such practices are comprehensively covered in 21 contributions by outstanding and distinctive authors.

Provides comprehensive coverage of the interpretation of LC-MS-MS mass spectra of 1300 drugs and pesticides Provides a general discussion on the fragmentation of even-electron ions (protonated and deprotonated molecules) in both positive-ion and negative-ion modes This is the reference book for the interpretation of MS-MS mass spectra of small organic molecules Covers related therapeutic classes of compounds such as drugs for cardiovascular diseases, psychotropic compounds, drugs of abuse and designer drugs, antimicrobials, among many others Covers general fragmentation rule as well as specific fragmentation pathways for many chemical functional groups Gives an introduction to MS technology, mass spectral terminology, information contained in mass spectra, and to the identification strategies used for different types of unknowns This thesis covers a range of important issues in hair analysis and includes 27 scientific works in which the name of the candidate was either listed as the first author or as the

major contributor. The work presented in this thesis involved the development of a series of analytical methods to detect trace amounts of drugs in hair and also investigated the mechanisms by which drugs may be incorporated into hair. The major areas covered in this study can be summarized as follows: 1. The methods for the identification and quantification of opiates, amphetamines, ketamine, cannabis, cocaine, benzodiazepines, antidepressants, antipsychotics, and anabolic steroids in hair were developed using gas chromatography-mass spectrometry (GC-MS), liquid chromatography-tandem mass spectrometry (LC-MS/MS) and gas chromatography-tandem mass spectrometry (GC-MS/MS). With GC-MS methods, the limits of detection were 0.1-0.5 ng mg⁻¹ of hair for antidepressants and antipsychotics. For illegal drugs, hair specimens were analyzed by GC-MS with limits of detection of 0.02-2ng mg⁻¹. GC/MS/MS is more sensitive than GC-MS to detect these drugs in hair. The lower limits of detection ranged from 0.001 to 0.020 ng mg⁻¹ for 21 anabolic androgenic steroids and their esters in hair using liquid chromatographic-tandem mass spectrometric method. And the limits of detection ranged from 0.2 to 5 pg mg⁻¹ for benzodiazepines in hair. Tandem mass spectrometry is characterized by its sensitivity, selectivity and specificity, which makes it particularly suitable for the analysis of trace amount of target analytes in hair. 2. Usually, screening for drugs of abuse is the first step in clinical and forensic toxicology. There are a large number of controlled substances and doping agents and novel compounds, which have yet to be characterised. A series of screening methods for drugs of abuse in hair were developed using LC-MS/MS and GC-MS/MS. Using our own library of MRM transitions, the optimum collision energies selected for each transition and retention times were set up. These methods have been applied successfully in forensic casework. 3. Of growing importance to the field of hair analysis is the detection of metabolites related to the parent drugs. Demonstrating the presence of a metabolite of a drug (such as, heroin, amphetamines, cocaine, meperidine, ketamine, triazolam or psychotropic drugs) provides compelling evidence for exposure to the parent drug, and permits distinction between external contamination from ingestion and facilitation of the interpretation of results. The presence of antidepressant and antipsychotic drugs and their metabolites in the hair of psychiatric patients was investigated using GC-MS-EI and GC-MS-PCI. The parent drug and its major metabolite, such as opiates (morphine, 6-acetylmorphine), methamphetamine (methamphetamine, amphetamine), ketamine (ketamine, norketamine), cocaine (cocaine, benzoecognine), meperidine (meperidine, normeperidine), triazolam (triazolam, [alpha]-hydroxytriazolam), and clonazepam (clonazepam, 7-aminoclonazepam) were quantified in authentic hair samples simultaneously. The differences were finding in the ratio of parent drug to metabolite. For illegal drugs, the concentrations of parent drugs were higher than that of their metabolites. The results of triazolam and clonazepam were contrary. These data are suitable reference values and are the basis for the interpretation of results. 4. The mechanisms by which drugs are incorporated into hair are not fully understood. Based on experiments with guinea pigs with black, white, or brown hair, the mechanisms of incorporation of cocaine, methamphetamine, ketamine, triazolam and anabolic steroids into hair were investigated. The concentrations of drugs in hair were found to be related to physicochemical properties of drugs. The parent drugs were the predominant analytes in hair. There was an obvious relationship between the concentration of drugs in hair and hair pigmentation. The concentrations of drugs deposited in black hair was found to be higher than that in brown and white hair samples, even when comparing results using hairs on the same multicoloured animal body. This work confirmed that melanin affinity is a governing factor in drug incorporation into hair shafts. These studies on the distribution of drugs in the hair shaft and how their concentration changes along the shaft provide information relevant to the time of ingestion and substance use/abuse. 5. In recent years an increase in drug-facilitated sexual assault (DFSA) has been reported. Segmental hair analysis has proved useful in widening the window of detection, as blood and urine analyses are of limited use, due to the long delays between the actual assaults and obtaining samples from suspects that are frequently encountered in investigations of such crimes. In China, benzodiazepines are the most frequently observed compounds in cases of drug-facilitated crime. In a paper reported here, 14 volunteers ingested a single 1-6 mg estazolam tablet to permit the evaluation of segmental hair analysis after a single drug dosage. Hair was collected one month after administration of the drug. All the proximal segments tested positive for estazolam. With increased dosage, estazolam could be detected in the 2-4 cm segments nearest the hair root in some subject's hair shafts. In some cases, the 4-6 cm segments also tested positive. Hair analysis was applied to samples from two authentic criminal cases. A significant variation was observed between those obtained from previous studies and the results presented here. The intersubject variability in segmental analysis can be explained mainly due to melanin content and diffusion from sweat or other secretions during formation of the hair shaft. However, more substantial procedural and interpretation guidelines are required to use segmental hair analysis in drug-facilitated crimes. On the other hand, the minimal dosage for detection, which is a critical but previously unknown threshold value of fundamental importance in hair analysis, was determined for triazolam and ketamine in guinea pig hair. 6. Doping with endogenous anabolic steroids is one of the most serious drug issues in sports today. The measurement of anabolic steroid levels in human hair permits the distinction between pharmaceutically produced steroids and naturally occurring steroids. Full-length hair samples were taken at the skin surface from the vertex of 39 males, 30 females and 11 children from China. None of the subjects were professional athletes. Testosterone and dehydroepiandrosterone were detected in all the hair segments. The physiological concentrations of testosterone were in the range 0.8-24.2 pg mg⁻¹, 0.1-16.8 pg mg⁻¹ and 0.2-11.5 pg mg⁻¹ in males, females and children, respectively. However, the mean values of dehydroepiandrosterone were much higher than those for testosterone. This is the first investigation into the physiological concentrations of anabolic steroids in human hair in Chinese subjects. These data provide suitable reference values and form the basis for the interpretation of results from investigations into the abuse of endogenous anabolic steroids. In conclusion, the work presented in this study demonstrates that there was a good correlation between the concentration of drugs in hair and drug dosage. There was an obvious relationship between hair drug concentration and hair colour. Melanin affinity is shown to be a governing factor in determining drug incorporation into hair, and the concentration of drugs deposited in black hair was found to be higher than that in brown and

white hair samples. This thesis provides data that will be useful in the application of hair analysis regarding drugs of abuse and in the interpretation of toxicological results. New designer drugs, access to databases, and changing availability of samples for analysis have changed the face of modern forensic toxicology in recent years. Forensic Toxicology: Drug Use and Misuse brings together the latest information direct from experts in each sub-field of the discipline providing a broad overview of current thinking and the most innovative approaches to case studies. The text begins with an in-depth discussion of pharmacoepidemiology, including information on the value of nationwide databases in forensic toxicology. The use and abuse of drugs in driving, sport and the workplace are then discussed by industry experts who are conducting case work in their field. Not only are new drug groups discussed (NPS), but also their constantly changing impact on drug legislation. Synthetic cannabinoids, khat and mephedrone are discussed in detail. Following a section devoted to legislation and defence, readers will find comprehensive chapters covering sample choice reflecting the increasing use of hair and oral fluid, and also the less commonly used sweat and nail analysis. New and old case examples are compared and contrasted in the final part of the book, which will enable readers to understand how drugs impact on each other and how the interpretative outcome of a case are dependent on many aspects. From use of pharmaceutical drugs in a clinical setting, through smart drugs to new psychoactive drugs, this book documents the wide range in which drugs today are abused. This book will be an essential resource for postgraduate students in forensic toxicology, and for researchers in forensic toxicology laboratories who need the latest data and knowledge.

Child abuse and suspicious child deaths are very complicated matters for clinicians, pathologists, law enforcement officials and legal professionals to investigate. Meanwhile, the evidence base for forensic pathology, especially in paediatrics, is steadily growing. In Paediatric Forensic Medicine and Pathology, two internationally acclaimed editors have brought together a first class author team who provide an up-to-date, comprehensive, and thorough review of the contemporary problems encountered in practice today. Individual chapters explore the emerging role of imaging in the diagnosis of non-accidental injury and compare recent evidence contrasting sudden infant death and SIDS; the head and neck injury chapter carefully explores the 'shaken baby syndrome' and similar patterns of injury that have recently gained widespread media attention. Special emphasis is given to interview and assessment procedures, and useful clinical forms are included throughout the book. Whether in a clinical, laboratory, or legal setting, readers dealing with forensic inquiries or who are in preparation for court will find the comprehensive background and evidence base necessary to support their investigations. Paediatric Forensic Medicine and Pathology is an invaluable resource for forensic pathologists, paediatric pathologists, and paediatricians, as well as all practitioners in the judicial and legal, criminal investigation and social services systems that have to deal with such cases.

Introduces readers to the state of the art of omics platforms and all aspects of omics approaches for clinical applications This book presents different high throughput omics platforms used to analyze tissue, plasma, and urine. The reader is introduced to state of the art analytical approaches (sample preparation and instrumentation) related to proteomics, peptidomics, transcriptomics, and metabolomics. In addition, the book highlights innovative approaches using bioinformatics, urine miRNAs, and MALDI tissue imaging in the context of clinical applications. Particular emphasis is put on integration of data generated from these different platforms in order to uncover the molecular landscape of diseases. The relevance of each approach to the clinical setting is explained and future applications for patient monitoring or treatment are discussed. Integration of omics Approaches and Systems Biology for Clinical Applications presents an overview of state of the art omics techniques. These methods are employed in order to obtain the comprehensive molecular profile of biological specimens. In addition, computational tools are used for organizing and integrating these multi-source data towards developing molecular models that reflect the pathophysiology of diseases. Investigation of chronic kidney disease (CKD) and bladder cancer are used as test cases. These represent multi-factorial, highly heterogeneous diseases, and are among the most significant health issues in developed countries with a rapidly aging population. The book presents novel insights on CKD and bladder cancer obtained by omics data integration as an example of the application of systems biology in the clinical setting. Describes a range of state of the art omics analytical platforms Covers all aspects of the systems biology approach—from sample preparation to data integration and bioinformatics analysis Contains specific examples of omics methods applied in the investigation of human diseases (Chronic Kidney Disease, Bladder Cancer) Integration of omics Approaches and Systems Biology for Clinical Applications will appeal to a wide spectrum of scientists including biologists, biotechnologists, biochemists, biophysicists, and bioinformaticians working on the different molecular platforms. It is also an excellent text for students interested in these fields.

This book provides a broad reference covering important drugs of abuse including amphetamines, opiates, and steroids. It also covers psychoactive plants such as caffeine, peyote, and psilocybin. It provides chemical structures, analytical methods, clinical features, and treatments of these drugs of abuse, serving as a highly useful, in-depth supplement to a general medical toxicology book. The style allows for the easy application of the contents to searchable databases and other electronic products, making this an essential resource for practitioners in medical toxicology, industrial hygiene, occupational medicine, pharmaceuticals, environmental organizations, pathology, and related fields.

Forensic Applications of Mass Spectrometry combines the most current developments in applications of mass spectrometry techniques to forensic analyses. The techniques discussed include: capillary-GC/MS thermospray-LC/MS tandem mass spectrometry (MS/MS) pyrolysis-GC/MS isotope ratio mass spectrometry The applications include: analysis of body fluids and hair for drugs of abuse drug testing in sports analysis of accelerants in fire debris detection of hidden explosives in luggage and mail identification of explosives in post-explosion debris examination of evidential materials (paints, fibers, synthetic polymers) authentication of regulated products (flavoring substances, fruit juices) protection of industrial products by isotopic signature

Enables you to detect, identify, and characterize hundreds of drugs that may be used by athletes Mass spectrometry has become essential to sports drug testing. This book examines both the principles of sports drug testing and the use of mass spectrometry techniques and mass spectral data to detect, identify, and characterize hundreds of known and unknown drugs that athletes may use to enhance their performance. The author provides a detailed overview of the mass spectrometry of numerous classes of therapeutics and agents, various analyzers to detect low- and high-molecular weight drugs, as well as techniques to discriminate between endogenously produced and synthetically derived compounds. Mass Spectrometry in Sports Drug Testing begins with a full chapter dedicated to the history of sports drug testing. Next, the book provides the principles and techniques needed to maximize the specificity and sensitivity of mass spectrometric assays, including: Detailed, step-by-step assays with sample preparation Discussion of both chromatographic separation and mass spectrometric analysis Characterization of analytes in order to unequivocally identify banned substances Mass spectrometric behavior of low- and high-molecular weight analytes Throughout the book, descriptive examples illustrate the principles, advantages, and limitations of different assays. Mass Spectrometry in Sports Drug Testing not only sets forth the role mass spectrometry plays in detecting drug use among athletes, it also adds new insights into the health and ethical issues of doping in sports.

Covers all major modifications, including phosphorylation, glycosylation, acetylation, ubiquitination, sulfonation and and glycation Discussion of the chemistry behind each modification, along with key methods

and references Contributions from some of the leading researchers in the field A valuable reference source for all laboratories undertaking proteomics, mass spectrometry and post-translational modification research

Doping represents the dark side of amateur and professional sports – in order to protect athletes around the globe, anti-doping rules are continuously revised and improved. This publication reviews the current regulatory framework, scientific aspects, future approaches, and social and ethical dimensions of the fight against doping in sport. Prominent experts on the implementation of anti-doping strategies, as well as leading researchers in science and medicine, have contributed to this publication. In keeping with its interdisciplinary origin, the book is intended for athletes, coaches, students, scientists, anti-doping officials, and all others interested in anti-doping and sports. Ranging from legal and educational to scientific and medical issues, this collection emphasizes the need for a multidisciplinary approach and the importance of preventative strategies in the fight against doping in sports.

Mass Spectrometry in Sports Drug Testing Characterization of Prohibited Substances and Doping Control Analytical Assays John Wiley & Sons

Provides a single-source reference for readers interested in the development of analytical methods for analyzing non-antimicrobial veterinary drug residues in food Provides a comprehensive set of information in the area of consumer food safety and international trade Covers general issues related to analytical quality control and quality assurance, measurement uncertainty, screening and confirmatory methods Details many techniques including nanotechnology and aptamer based assays covering current and potential applications for non-antimicrobial veterinary drugs Provides guidance for analysis of banned drugs including natural and synthetic steroids, Resorcylic acid lactones, and Beta-agonists

An in-depth text that explores the interface between analytical chemistry and trace evidence Analytical Techniques in Forensic Science is a comprehensive guide written in accessible terms that examines the interface between analytical chemistry and trace evidence in forensic science. With contributions from noted experts on the topic, the text features a detailed introduction analysis in forensic science and then subsequent chapters explore the laboratory techniques grouped by shared operating principles. For each technique, the authors incorporate specific theory, application to forensic analytics, interpretation, forensic specific developments, and illustrative case studies. Forensic techniques covered include UV-Vis and vibrational spectroscopy, mass spectrometry and gas and liquid chromatography. The applications reviewed include evidence types such as fibers, paint, drugs and explosives. The authors highlight data collection, subsequent analysis, what information has been obtained and what this means in the context of a case. The text shows how analytical chemistry and trace evidence can problem solve the nature of much of forensic analysis. This important text: Puts the focus on trace evidence and analytical science Contains case studies that illustrate theory in practice Includes contributions from experts on the topics of instrumentation, theory, and case examples Explores novel and future applications for analytical techniques Written for undergraduate and graduate students in forensic chemistry and forensic practitioners and researchers, Analytical Techniques in Forensic Science offers a text that bridges the gap between introductory textbooks and professional level literature.

This book is an up-to-date, extensive overview of the effects of physical activity and training on endocrine function. It gives insights into a complex relationship by describing effects with respect to exercise performance, growth, development, and ageing. It includes discussions of the endocrine response depending on exercise mode, intensity, and duration as well as on gender, age, and fitness level. Additionally the book deals with the impact of environmental and psychological factors on endocrine level. A substantial part of Sports Endocrinology is devoted to the 'hot topic' of hormonal doping in sports. The properties of androgens, growth hormone, erythropoietin, and dietary supplements are highlighted. The use and abuse among professional and recreational athletes is discussed and specific methods of detection are presented and explained. All contributors are well-known experts in sports medicine and endocrinology, endocrine physiology, pharmacology, and doping detection, so this book is a must-read for every professional involved in the field.

Nuclear magnetic resonance (NMR) is an analytical tool used by chemists and physicists to study the structure and dynamics of molecules. In recent years, no other technique has gained such significance as NMR spectroscopy. It is used in all branches of science in which precise structural determination is required and in which the nature of interactions and reactions in solution is being studied. Annual Reports on NMR Spectroscopy has established itself as a premier means for the specialist and non-specialist alike to become familiar with new techniques and applications of NMR spectroscopy. Nuclear magnetic resonance (NMR) is an analytical tool used by chemists and physicists to study the structure and dynamics of molecules. In recent years, no other technique has gained such significance as NMR spectroscopy. It is used in all branches of science in which precise structural determination is required and in which the nature of interactions and reactions in solution is being studied. Annual Reports on NMR Spectroscopy has established itself as a premier means for the specialist and non-specialist alike to become familiar with new techniques and applications of NMR spectroscopy.

Clinical Toxicology is the second volume of a three-volume set on molecular, clinical and environmental toxicology that offers a comprehensive and in-depth response to the increasing importance and abundance of chemicals of daily life. By providing intriguing insights far down to the molecular level, this three-volume work covers the entire range of modern toxicology with special emphasis on recent developments and achievements. It is written for students and professionals in medicine, science, public health or engineering who are demanding reliable information on toxic or potentially harmful agents and their adverse effects on the human body.

Facilitates the discovery and development of new, effective therapeutics With coverage of the latest mass spectrometry technology, this book explains how mass spectrometry can be used to enhance almost all phases of drug discovery and drug development, including new and emerging applications. The book's fifteen chapters have been written by leading pharmaceutical and analytical scientists. Their contributions are based on a thorough review of the current literature as well as their own experience developing new

mass spectrometry techniques to improve the ability to discover and develop new and effective therapeutics. Mass Spectrometry for Drug Discovery and Drug Development begins with an overview of the types of mass spectrometers that facilitate drug discovery and development. Next it covers: HPLC—high-resolution mass spectrometry for quantitative assays Mass spectrometry for siRNA Quantitative analysis of peptides Mass spectrometry analysis of biological drugs Applications that support medicinal chemistry investigations Mass spectrometry imaging and profiling Throughout the book, detailed examples underscore the growing role of mass spectrometry throughout the drug discovery and development process. In addition, images of mass spectra are provided to explain how results are interpreted. Extensive references at the end of each chapter guide readers to the primary literature in the field. Mass Spectrometry for Drug Discovery and Drug Development is recommended for readers in pharmaceuticals, including medicinal chemists, analytical chemists, and drug metabolism scientists. All readers will discover how mass spectrometry can streamline and advance new drug discovery and development efforts. Advances in Testosterone Research and Application / 2012 Edition is a ScholarlyPaper™ that delivers timely, authoritative, and intensively focused information about Testosterone in a compact format. The editors have built Advances in Testosterone Research and Application / 2012 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Testosterone in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Advances in Testosterone Research and Application / 2012 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Mass spectrometry is an analytical technique that can be used for the structural characterization and quantification of a wide range of molecules. The technique is extensively used by chemists for the analysis of small and volatile organic compounds. Mass spectrometry has long been an important technique for the identification of materials ranging from pure compounds to complex mixtures. Mass spectrometry can be used to determine molecular weight of compounds or using different ionization conditions, can provide more structural details through the analysis of fragmentation patterns. This level of detail can be attained for pure compounds and some mixtures. Mass spectrometry can also be combined with separation techniques such as gas chromatography or liquid chromatography to allow more complex mixtures to be examined. These hyphenated techniques provide a range of options for the characterization of complex materials.

This new volume in the Encyclopaedia of Sports Medicine series, published under the auspices of the International Olympic Committee, delivers an up-to-date, state of the art presentation of the scientific aspects of conditioning, injury prevention, and competition. The book covers the key areas of scientific knowledge in sport and is divided into: physiology and biochemistry; nutrition; anthropometry; immunology; cell biology; biomechanics, engineering and ergonomics; psychology; pharmacology; limitations to performance; special populations; and exercise and health. Presented in a clear style and format, The Olympic Textbook of Science in Sport, draws on the expertise of an international collection of contributors who are recognized as leaders in their respective fields. It will be indispensable for all sport scientists and medical doctors who serve athletes and sports teams and is an invaluable reference for students of sport and exercise science.

With usage of mass spectrometry continually expanding, an increasing number of scientists, technicians, students, and physicians are coming into contact with this valuable technique. Mass spectrometry has many uses, both qualitative and quantitative, from analyzing simple gases to environmental contaminants, pharmaceuticals, and complex biopolymers

This book provides a detailed description of various multidimensional chromatographic separation techniques. The editor first provides an introduction to the area and then dives right into the various complex separation techniques. While still not used routinely comprehensive chromatography techniques will help acquaint the readers with the fundamentals and possible benefits of multi-dimensional separations coupled with mass spectrometry. The topics include a wide range of material that will appease all interested in either entering the field of multidimensional chromatography and those looking to gain a better understanding of the topic.

Provides a comprehensive description of mass spectrometry basics, applications, and perspectives Mass spectrometry is a modern analytical technique, allowing for fast and ultrasensitive detection and identification of chemical species. It can serve for analysis of narcotics, counterfeit medicines, components of explosives, but also in clinical chemistry, forensic research and anti-doping analysis, for identification of clinically relevant molecules as biomarkers of various diseases. This book describes everything readers need to know about mass spectrometry—from the instrumentation to the theory and applications. It looks at all aspects of mass spectrometry, including inorganic, organic, forensic, and biological MS (paying special attention to various methodologies and data interpretation). It also contains a list of key terms for easier and faster understanding of the material by newcomers to the subject and test questions to assist lecturers. Knowing how crucial it is for young researchers to fully understand both the power of mass spectrometry and the importance of other complementary methodologies, Mass Spectrometry: An Applied Approach teaches that it should be used in conjunction with other techniques such as NMR, pharmacological tests, structural identification, molecular biology, in order to reveal the true function(s) of the identified molecule. Provides a description of mass spectrometry basics, applications and perspectives of the technique Oriented to a broad audience with limited or basic knowledge in mass spectrometry instrumentation, theory, and its applications in order to enhance their competence in this field Covers all aspects of mass spectrometry, including inorganic, organic, forensic, and

biological MS with special attention to application of various methodologies and data interpretation Includes a list of key terms, and test questions, for easier and faster understanding of the material Mass Spectrometry: An Applied Approach is highly recommended for advanced students, young scientists, and anyone involved in a field that utilizes the technique.

Illicit drugs are an emerging class of environmental contaminants and mass spectrometry is the technique of choice for their analysis. This landmark reference discusses the analytical techniques used to detect illicit drugs in wastewater and surface water, details how to estimate the levels of contaminants in the environment, and explores the behavior, fate, and toxic effects of this new class of contaminants, now a ubiquitous presence in wastewater and surface water. The book details how an estimate of illicit drug consumption in a given population can be developed from an analysis of the residues of illicit drugs in wastewater. An important resource for analytical chemists, environmental researchers, forensic scientists, biologists, and toxicologists.

Physical activity exerts an important influence on the endocrine system, modulating synthesis and secretion of several hormones. Almost every organ and system in the body is affected by physical activity and exercise, mainly through the endocrine and neuroendocrine system. Mode, intensity, and duration of the exercise bout, age, gender and fitness level of the individual as well as environmental and psychological factors may affect the endocrine response to physical activity. On the other hand, several hormones are able to influence physical performance and body composition. Thus, a bi-univocal interrelationship between exercise and hormones exists. In this book new developments on metabolic and endocrine response to exercise are revised and introduce the "hot topic" of hormonal doping in sports. In the past decades, hormone abuse has become a widespread habit among professional and – most of all and more frequently – recreational athletes. A substantial part of this volume is devoted to the effects of exogenous hormones on performance. Anabolic steroids, growth hormone and erythropoietin properties, use and misuse in sports are widely described. Specific methods to detect hormone abuse are presented and discussed. The contributors to this volume are well-known experts and dedicated researchers in the fields of sports medicine and endocrinology, endocrine physiology, pharmacology, and doping detection. The purpose of this volume is to provide all professionals involved in sports medicine and endocrinology a state-of-the-art overview of the complex interactions between physical activity and the endocrine system and to focus on hormone abuse in sports at competitive and recreational level highlighting its negative consequences for long-term health.

N/A

Provides the latest "-omics" tools to advance the study of food and nutrition The rapidly emerging field of foodomics examines food and nutrition by applying advanced "-omics" technologies in order to improve people's health, well-being, and knowledge. Using tools from genomics, transcriptomics, epigenomics, proteomics, and metabolomics, foodomics offers researchers new analytical approaches to solve a myriad of current challenges in food and nutrition science. This book presents the fundamentals of foodomics, exploring the use of advanced mass spectrometry techniques in food science and nutrition in the post-genomic era. The first chapter of the book offers an overview of foodomics principles and applications. Next, the book covers: Modern instruments and methods of proteomics, including the study and characterization of food quality, antioxidant food supplements, and food allergens Advanced mass spectrometry-based methods to study transgenic foods and the microbial metabolome Mass spectrometry-based metabolomics in nutrition and health research Foodomics' impact on our current understanding of micronutrients (phenolic compounds and folates), optimal nutrition, and personalized nutrition and diet related diseases Principles and practices of lipidomics and green foodomics Use of chemometrics in mass spectrometry and foodomics The final chapter of Foodomics explores the potential of systems biology approaches in food and nutrition research. All the chapters conclude with references to the primary literature, enabling readers to explore individual topics in greater depth. With contributions from a team of leading pioneers in foodomics, this book enables students and professionals in food science and nutrition to take advantage of the latest tools to advance their research and open up new areas of food and nutrition investigation.

Drug use and abuse is perhaps the biggest challenge facing sport today. However, in the eye of the storm of public and press opinion and with medals and morals at stake, it can be difficult to gain a clear perspective on this complex issue. Drugs in Sport is the most comprehensive and accurate text available on the subject. Now in a fully revised and updated fifth edition, taking into account the latest regulations, methods and landmark cases, the book explores the hard science behind drug use in sport, as well as the ethical, social, political and administrative context. Key topics include: mode of action and side effects of each major class of drugs used in sport discussion of cutting-edge issues, including gene doping the latest doping control regulations of the World Anti-Doping Agency (WADA) methods and advances in doping control, including new intelligence-led detection policies the use of Therapeutic Use Exemption for certain drugs banned in sport issues surrounding non-prohibited substances and ergogenic aids an assessment of the prevalence of drug taking in sport. Accessibly written, extensively referenced, and supported throughout with illustrative case studies and data, Drugs in Sport provides a comprehensive, objective resource for students and researchers, athletes, sports scientists, coaches, journalists, sports administrators and policymakers.

Drug use and abuse represents perhaps the most profound and high-profile issue facing sport today. Each major international championship seems to deliver a new drug-related controversy, while drug takers and sports administrators attempt to out-manoeuvre each other with new substances and new testing procedures. Drugs in Sport - 3rd Edition is a fully revised and updated version of the most comprehensive and authoritative text available on the subject. Leading figures in the field explore the hard science behind every major class of drug, as well as the social, ethical and organisational dimensions to the issue. Key topics include: * analysis of all the key substances, including anabolic steroids,

EPO and human growth hormone * alcohol and social drug use in sport * creatine and nutritional supplements * evidence and issues around doping control in sport. This is a highly accessible text for all sports science and sports studies students, coaches and professional sports people, and sports administrators and policy-makers.

Time of flight mass spectrometry identifies the elements of a compound by subjecting a sample of ions to a strong electrical field. Illuminating emerging analytical techniques in high-resolution mass spectrometry, Liquid Chromatography Time-of-Flight Mass Spectrometry shows readers how to analyze unknown and emerging contaminants—such as antibiotics, steroids, analgesics—using advanced mass spectrometry techniques. The text combines theoretical discussion with concrete examples, making it suitable for analytical chemists, environmental chemists, organic chemists, medicinal chemists, university research chemists, and graduate and post-doctorate students.

Considered the definitive source in its field for over 35 years, *Endocrinology: Adult and Pediatric*, has been thoroughly updated to reflect today's recent advances in adult and pediatric endocrinology. Unique perspectives from a team of trusted, world-renowned experts ensure this medical reference book remains the most highly-regarded text in the field. Make the best clinical decisions with an enhanced emphasis on evidence-based practice and expert opinions on treatment strategies. Zero in on the most relevant and useful references with the aid of a more focused, concise bibliography. Locate information quickly, while still getting the complete coverage you expect. Expanded coverage for key topics such as pediatric endocrinology and obesity mechanisms and treatment, in addition to today's hot topics in endocrinology, including endocrine disruptors, bariatric surgery, androgen deficiency, genetic causes of obesity, endocrine rhythms, and the use of tyrosine kinase inhibitors in thyroid cancer. New content addressing the latest advances in testosterone and estrogen replacement, as well as the new causes of calcium and phosphate disorders, new molecular causes of endocrine cancers, new genetic causes of reproductive disorders, and more. Updated clinical guidelines for diabetes, lipid disorders, obesity management, osteoporosis, and more, as well as essential treatment updates for the medical management of acromegaly, Cushing's Disease, hypercalcemia, and diabetes mellitus. New Key Points provide snapshots of what to expect in each chapter, or serve as a refresher of what you just read. Consult this title on your favorite e-reader.

With contributions from noted experts from Europe and North America, *Mass Spectrometry Instrumentation, Interpretation, and Applications* serves as a forum to introduce students to the whole world of mass spectrometry and to the many different perspectives that each scientific field brings to its use. The book emphasizes the use of this important analytical technique in many different fields, including applications for organic and inorganic chemistry, forensic science, biotechnology, and many other areas. After describing the history of mass spectrometry, the book moves on to discuss instrumentation, theory, and basic applications.

With its detailed and systematic coverage of the current state of biophysical mass spectrometry (MS), here is one of the first systematic presentations of the full experimental array of MS-based techniques used in biophysics, covering both fundamental and practical issues. The book presents a discussion of general biophysical concepts and a brief overview of traditional biophysical techniques before outlining the more advanced concepts of mass spectrometry. The new edition gives an up-to-date and expanded coverage of experimental methodologies and a clear look at MS-based methods for studying higher order structures and biopolymers. A must for researchers in the field of biophysics, structural biology, and protein chemistry.

Drug Discovery and Evaluation has become a more and more difficult, expensive and time-consuming process. The effect of a new compound has to be detected by in vitro and in vivo methods of pharmacology. The activity spectrum and the potency compared to existing drugs have to be determined. As these processes can be divided up stepwise we have designed a book series "Drug Discovery and Evaluation" in the form of a recommendation document. The methods to detect drug targets are described in the first volume of this series "Pharmacological Assays" comprising classical methods as well as new technologies. Before going to man, the most suitable compound has to be selected by pharmacokinetic studies and experiments in toxicology. These preclinical methods are described in the second volume „Safety and Pharmacokinetic Assays". Only then are first studies in human beings allowed. Special rules are established for Phase I studies. Clinical pharmacokinetics are performed in parallel with human studies on tolerability and therapeutic effects. Special studies according to various populations and different therapeutic indications are necessary. These items are covered in the third volume: „Methods in Clinical Pharmacology".

The work of dope testers is constantly being obstructed by the development of ever harder-to-trace new forms of banned substances. Organisations such as the World Anti-Doping Association and the United States Anti-Doping Agency are pioneering cutting-edge techniques designed to keep competition at the highest level fair and safe, and must ensure that their drug testing laboratories adhere to the highest scientific standards. In *Pharmacology, Doping and Sports* these techniques and procedures are explained by the anti-doping experts who practice them. Broad-ranging in scope, this book examines the effects of performance-enhancing substances on the athlete's health; the role of anti-doping procedures as an ethical question, and explains the background to, and the emergence of, the anti-doping movement. The book also offers in-depth analysis of key scientific matters, such as: standard analytical and diagnostic tests for sports doping regulatory standards for laboratory proficiency common performance-enhancing techniques such as anabolic and designer steroids, blood doping, growth hormones, and gene doping carbon-isotope ratio testing. Written by some of the world's leading authorities on the science of sports doping, *Pharmacology, Doping and Sports* provides an invaluable study of up-to-the-minute anti-doping techniques. This book is essential reading for all sports scientists, coaches, policy-makers, students and athletes interested in the science or ethics of doping in sport.

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