

A content analysis of anti-doping sciences and interventions

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Introduction

- The World Anti-Doping Agency (WADA) has regulated the use of performance-enhancing drugs since its establishment in 1999
- The WADA mandates an anti-doping standard, which is applicable to professional athletes and the athlete's support personnel

Objective

- To conduct content analysis of the International Olympic Committee's materials in *Drugs in Sport*, which entails the methods of doping as well as the sanction process for doping charges

The WADA Prohibited List

- Substances and methods prohibited in- and out-of-competition
 - Anabolic agents, peptide hormones, growth factors, Beta-2 agonists, hormone and metabolic modulators
 - Diuretics and masking agents
 - Manipulation of blood (blood doping)
 - Chemical and physical manipulation in sample collection process
 - Gene and cell doping
- Substances prohibited in-competition
 - Stimulants, narcotics, cannabinoids, glucocorticoids, beta-blockers (specific sports)

Considerations for Testing Prohibited Substances

- Biological matrix
- Route of administration
- Frequency and amount of dosing
- Polymorphisms in metabolism

Alternative Matrices to Urine - Oral Fluid Testing

- Less invasive
- Harder to tamper with
- Specimen is gender neutral

- May reflect more recent drug use
- Can identify markers of recent cannabis use
 - Useful for in-competition testing

Alternative Matrices to Urine - Blood

- Identifies hGH doping through two hGH markers, IGF-I and P-III-NP

Recent Advances – Athlete Biological Passport

- Monitors biomarkers of doping over time to uncover effect of doping
- Haematological module
 - Identifies changes in oxygen transport, use of erythropoiesis-stimulating agents, and blood transfusions/manipulations
- Steroidal module
 - Identifies anabolic androgenic steroids

Anti-Doping Rule Violations (ADRV)

- identified through testing at independent WADA laboratories
- Athlete have option to challenge sanctions and independent arbitration hearings are conducted
- May appeal decision to Court of Arbitration for Sport

Future Research in Anti-Doping

- Biological testing still underestimates the prevalence of doping
- There's a need to develop new technologies and approaches to identify doping
- Next generation technologies
 - Genomics, transcriptomics, proteomics, metabolomics
 - DNA sequencing – Illumina
- Performance profiling

References

International Olympic Committee, *Drugs in Sport Certification*, Lausanne, Switzerland.