Scientific Research Grants Topics

The HMRC has identified relevant areas of research in the field of anti-doping; in particular, those related to the List of Prohibited Substances and Methods.

Higher priority is granted to proposals addressing:

- Detection/improvement of detection/quantification of peptide and protein hormones and growth factors, preferably by, but not limited to, chromatography-mass spectrometric methods;
- Improved window (retrospectivity) of detection of prohibited substances/methods that are prohibited at all times (*e.g.,* detection of new long-term metabolites including administration studies, improved methodologies of detection, analyte multiplexing);
- Pharmacokinetic studies to establish thresholds or minimum reporting levels (MRLS) of prohibited substances or their metabolites (*e.g.*, beta-2 agonists, stimulants) to distinguish permitted (*e.g.,* out-of-competition or route of administration) from prohibited use, natural sources vs. intended use or presence in food residues (contamination/contaminants);
- Detection of autologous blood transfusion, including validation of candidate biomarkers or molecular/cellular/subcellular signatures;
- Further development of the Athlete Biological Passport (*e.g.,* new biomarkers of doping or confounding factors relevant to the hematological, steroidal or endocrine [markers of growth hormone] modules);
- Advance on dried blood spots (DBS) program, such as the definition of MRLs for substances prohibited in-competition only (priority to stimulants/substances of abuse);
- Detection of gene and cell doping (details provided at the E category, below)
- Synthesis of selected Certified Reference Materials; and
- Studies on weight management drugs, contamination substances or cannabis (Marijuana).

Proposals are classified as follows:

A. Detection of doping substances/methods: methodologies in analytical chemistry; and, in particular, research addressing:

- The detection of doping substances and methods using chromatography-mass spectrometric methods or new methods in analytical chemistry.

B. Detection of doping substances/methods: affinity-binding and biochemical methodologies; and, in particular, research addressing:

- The detection of doping substances and methods using immunoassays, other assays based on affinity-binding reagents or other biochemical methods; and
- Multiplexing of validated affinity binding-based assays and other biochemical approaches.

C. Pharmacological studies of doping substances/methods; and, in particular, research addressing:

- Establishment and/or refinement of thresholds/MRLs of prohibited substances or their metabolites in urine/blood/DBS:

  - Stimulants/substances of abuse in DBS;
  - Substances that may be produced endogenously, or present in foodstuff or as contaminants;
  - Substances that are associated with doping effects above a certain dose or depending on route or time of administration;
- Pharmacokinetics/pharmacodynamics/metabolism of prohibited substances and methods including impact of sex, genetics, and environmental factors on excretion, detection or biological action;
- Doping potential and strategies for detection of drugs, drug interactions (cocktail formulations) or drug micro-dosing; and
- Long-term metabolites or markers of doping substances.

D. The Athlete Biological Passport (ABP); and, in particular, research addressing:

- Discovery and validation of new discriminant markers for the Hematological, Steroidal and Endocrine modules of the ABP, including transcriptomic, metabolomic and proteomic approaches;
- Discovery and evaluation of confounding factors and validation of new biomarkers, or improved use of existing markers, of exposure to confounding factors that can be leveraged to increase the specificity of the current modules;
- Improvement of analytical methods for detecting ABP markers and exploring alternative sample matrices with the aim of reducing the cost of analysis, increasing the ability to multiplex additional markers, improving marker stability upon transport/storage; and
- Development of novel approaches for analysis of biological data, including multiparametric approaches, machine learning, and AI-based approachesR to improve sensitivity/specificity by exploiting factors such as the longitudinal nature of passport data and knowledge of sources of marker variance (e.g. diurnal, within-subject and between subject variance, etc.).

E. Detection of doping substances/methods: molecular biology, "omics" and miscellaneous methodologies; and, in particular, research addressing:

- Methods for detecting gene delivery systems (e.g. AAVs) and gene/gene expression modifications (e.g., CRISPR-Cas, RNA editing, antisense therapy, epigenome editing) including multiplexed methods;
- Advancement of sequencing methods (e.g., DNA, RNA, cell-free DNA), both targeted and unbiased;
- Development and validation of indirect detection methods of gene and cell doping (e.g., immune responses to vectors, biomarkers, bioassays);
- Updates on RNA therapeutics, including delivery systems;
- Potential of cell-based interventions (e.g., genetically modified cells, stem cell treatments, and cell-derived products such as exosomes, microvesicles, and cell organelles) for performance enhancement and approaches for their detection in muscle(s), connective tissues or other tissues and organs relevant in sport;
- Validation of molecular and metabolic signatures to detect use of prohibited substances and methods (e.g., autologous blood transfusion);
- Role of sequence analysis in Athlete Biological Passport.

F. Scientific innovations* to improve anti-doping programs; and, in particular, research addressing:

- Data analytics, artificial intelligence (AI) to identify trends in doping, to improve the detection of prohibited substances and/or methods, to develop tools to improve doping detection, such as research addressing:
  - Use of statistical models/AI to monitor unusual changes in athletes' performances to better target testing);
  - Development of analytical strategies, by using non-targeted and suspect screening approaches.

* Projects primarily focused on social science research are not eligible.

Application guidelines for the scientific research grants are available on WADA website with more information about the submission and review processes (e.g., documents requested for EOI/full application submission).

To complement the year-round call for proposals, WADA releases special calls for projects when topics of interest are identified. Open topics are listed on the WADA website, with links to more detailed requests for applications where relevant.