

Editorial

Anti-doping laboratories are dedicated to the analysis of sports doping control tests. In parallel with routine analyses, laboratories accredited by the World Anti-Doping Agency (WADA) have an active role in the field of research and in the development of doping control. This special issue of *Drug Testing and Analysis* introduces a selection of recent advances in doping control initiated by anti-doping laboratories.

The dynamic list of prohibited substances (http://www.wada-ama.org/Documents/World_Anti-Doping_Program/WADP-Prohibited-list/WADA_Prohibited_List_2010_EN.pdf) is updated annually and rational analytical strategies with sensitive methods should be established to cover all the relevant target analytes from a limited sample volume, with fast turn-over times when required and with reasonable costs. Incorporation of emerging drugs into routine analytical procedures requires studies of metabolic pathways in order to select representative target compounds. Traditionally this is done by controlled excretion studies in human but recent results have also shown the possibility of mimicking the human metabolism in *in vitro* assays.^[1,2] After determination of the relevant analytes there is a need to synthesize certified reference material^[3] and to develop and validate the qualitative or quantitative analytical method. New compounds may require application of totally new analytical approaches or modifications of existing methods, especially when the representative sample matrix is blood instead of the traditional urine^[4] or if the prohibited substance may be produced endogenously.^[5–7] With the increasing sensitivity and novel technologies of analytical instruments, as well as information gained on prohibited substances the development work of the laboratories also consists of updating of routine analytical methods. Occasionally methods are developed not only to analyse the prohibited substances but also to support a finding with additional results or to exclude the possibility of a physiological or pathological condition causing an analytical finding.^[8]

The challenge of implementing the achievements of basic research and technologies in a context of routine doping control without compromising the athlete's legal rights requires collaboration between specialists from different areas of science. Methods can be developed efficiently and analytical breakthroughs can be achieved by adapting up-to-date instrument techniques and

methodologies and this is often accomplished in national and international joint research projects.

However, the challenges in doping control are not only analytical. A good example of the future challenges and the major change in doping control will be the introduction of 'biological passports', e.g. frequent measurement of blood parameters and the establishment of profiles of individual athletes instead of setting population study-based thresholds in order to reveal the use of prohibited substances or methods. When collecting the blood samples the validity of the system relies on pre-analytical work and other important factors such as organization of the tests, sample collection, transportation and smooth co-operation and communication between all the stakeholders, involving the whole anti-doping community, sport federations, national organizations and laboratories.^[9] As the anti-doping community is not an isolated section of society, multilateral discussion, sharing of knowledge and networking with authorities from the clinical, legal and forensic fields could assist in solving the various problems arising from the same source.^[10]

References

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