

FIFA`s approach to doping in football

Doping control from yesterday to today

It is only 38 years since drug testing was first introduced at the 1968 Olympic Games in Mexico City following the amphetamine and nicotiny tartrate-related deaths of a number of cyclists at the 1960 summer Olympic Games in Rome and during the 1967 Tour de France. Regular doping controls have been conducted since, but these controls have failed to prevent sportsmen and women from taking performance enhancing drugs both during and out of competition.

Sporting associations like FIFA have stated that the fundamental aims of doping controls and anti-doping policies are:

- to uphold and preserve the ethics of sport;
- to safeguard the physical health and mental integrity of the player;
- to ensure that all competitors have an equal chance.

FIFA introduced doping controls in 1970 to ensure that the results of national and international matches were a fair reflection of the ability of those taking part. The FIFA Sports Medical Committee has the responsibility for implementing doping controls at all FIFA competitions and also for coordinating with confederations and member associations.

Today, banned and harmful substances are openly available even without prescription. Drugs such as nandrolone and others can be ordered over the internet in unlimited quantities. In recent years, the number of positive cases of so-called recreational drugs like marijuana and cocaine has increased and needs to be addressed accordingly. In addition, media reports may encourage those competing at lower levels of sport to experiment with doping substances without considering the dangerous side effects, let alone the legal consequences of their actions.

What is doping?

Doping is defined as any attempt either by the player, or at the instigation of another person such as manager, coach, trainer, doctor, physiotherapist or masseur, to enhance mental and physical performance unphysiologically or to treat ailments or injury – when this is medically unjustified – for the sole purpose of taking part in a competition. This includes using (taking or injecting), administering or prescribing prohibited substances prior to or during a competition. These stipulations also apply to out-of-competition testing for anabolic steroids and peptide hormones as well as to substances producing similar effects. Other prohibited methods (e.g. blood doping) or manipulation of collected samples are likewise classified as doping.

The detailed definition is presented in the FIFA doping control regulations (January 2006, [link](#)). Doping contravenes the ethics of sport, constitutes an acute or chronic health hazard for players and may have fatal consequences.

Facts on doping in football

FIFA is a global organisation that unifies over 250 million footballers in 207 countries with around 40 million of these players being female. Currently, confederations and members associations carry out their own doping controls at competitions that they stage. The samples must, however, be analysed at FIFA/WADA-accredited laboratories. These laboratories send reports on any "chemically positive" A samples to the member associations, as well as to FIFA headquarters for management and to WADA for information. Once the FIFA medical

department has received a positive A sample report, follow up information is required by the member association or the confederation in question to receive the results of the possible B sample and the particular disciplinary committee decision. If the information is not provided, the FIFA Disciplinary Committee takes appropriate action.

A new doping control policy for FIFA competitions was introduced at the FIFA U-17 World Championship in New Zealand in 1999. Since that time, during tournaments, two players from each team have been randomly selected to undergo doping tests after each match.

The physicians of the finalists demonstrated their strong support of FIFA's strategy in the fight against doping prior to the 2002 FIFA World Cup Korea/Japan™ and the 2006 FIFA World Cup Germany™, when they unanimously signed a joint declaration in order to keep this unique event free of doping. This was a firm message to the football community.

Doping results from FIFA tournaments

Since the 1994 FIFA World Cup™ in the United States, the FIFA medical department has been stringently registering all performed samples. Between 1994 and 2005, 3 327 doping controls were performed on men and women during four consecutive FIFA World Cup™ competitions, two consecutive Olympic Games as well as at FIFA Women's World Cup 2003, the FIFA U-19 Women's World Championship, the FIFA U-17 World Championship, the FIFA Confederations Cup, the FIFA Club World Championship in Japan, the FIFA Beach Soccer World Cup, the FIFA U-20 World Championship and the FIFA Futsal World Championship. Only four samples tested positive during this period: one for ephedrine and pseudoephedrine in 1994, one for cannabis and one for nandrolone during the 2003 FIFA World Youth Championship in the United Arab Emirates, and one for ephedrine in Angola. This reflects an overall incidence of 0.12% positive cases over the past eleven years.

This extremely low number indirectly confirms FIFA's strategy in the fight against doping, that education and prevention are key issues in keeping high-profile competitions free of doping. It can only be assumed that team sports such as football are not as prone to abuse of performance enhancing substances in comparison to individual sports. When looking at positive doping cases during the 2004 Olympic Games in Athens, 27 positive cases were detected: all in individual athletes and none in any team sport participants.

Although several prominent footballers have tested positive for drugs in recent decades, the true extent of the problem is unknown. Even if we assume that doping is still not a major issue in team sports such as football, any estimation of the problem can be considered to be merely an unscientific hypothesis or speculation.

According to IOC statistics until 2003 and WADA-accredited laboratories as of 2004 approximately 20,750 doping controls are performed annually on football players. The majority of tests are performed in Europe, North and South America. The number of doping controls continues to increase in the other confederations.

No evidence for systematic doping in world football

FIFA has developed its own database of the samples reported as positive to allow control of their management within the confederations and member associations. During 2004 and 2005, there were 88 (0.42% based on the assumption of 20,750 samples per year) and 78 (0.37%) positive samples respectively registered at FIFA (see Figure 1).

Doping statistic 2004 - 2005

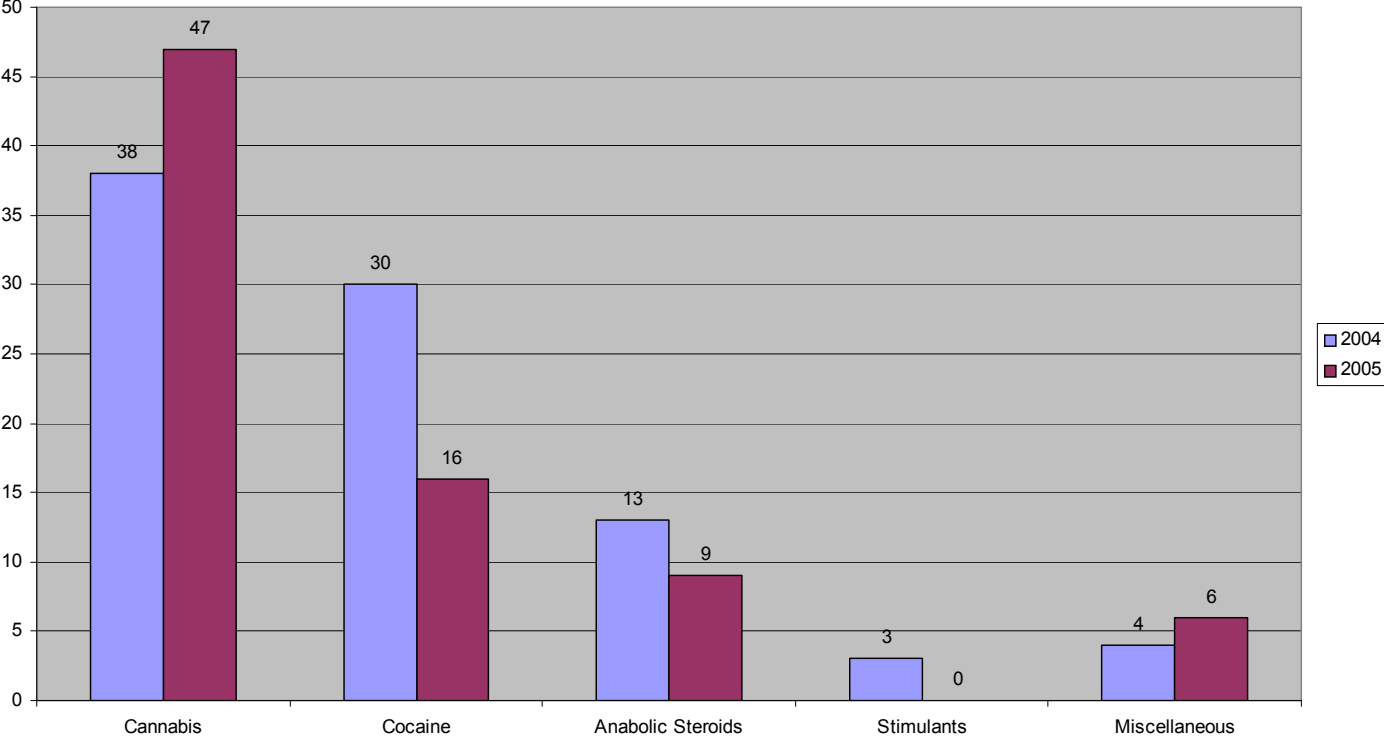


Figure 1: FIFA doping statistics per substance for 2004 and 2005 (excl. T/E)

Most of these cases were detected or reported by the European Laboratories that receive most of their samples from European associations (see figures 2 and 3).

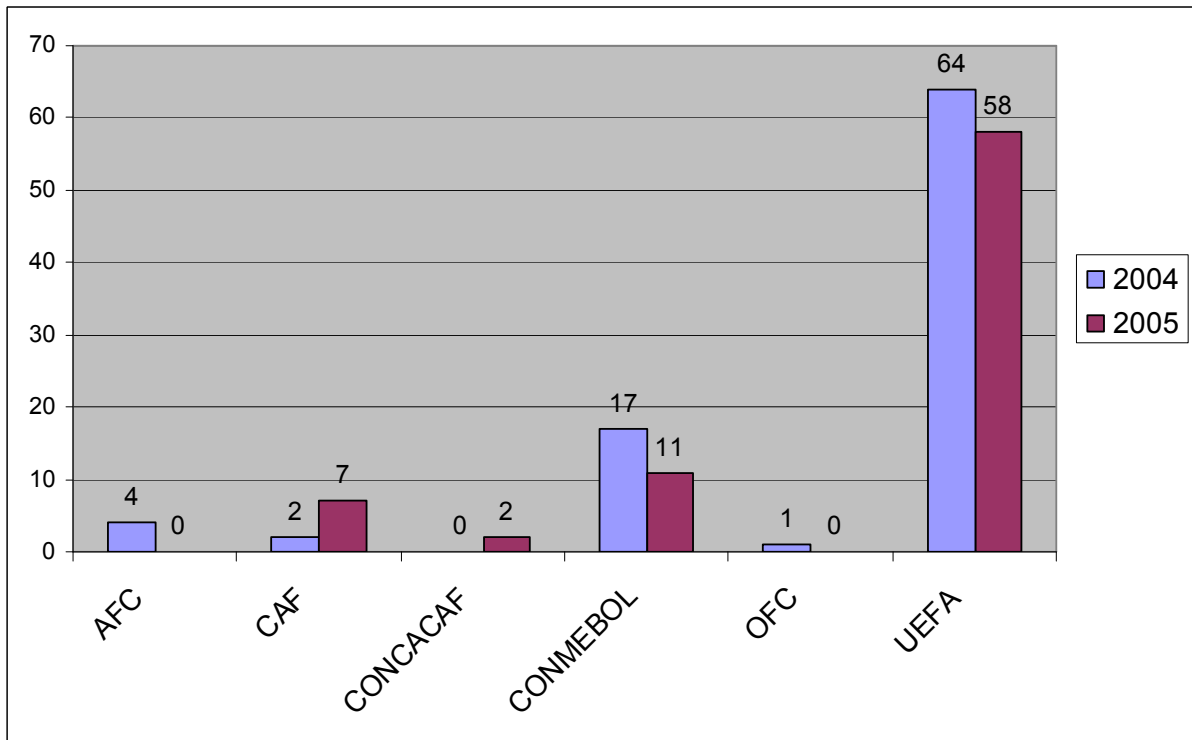


Figure 2: FIFA statistic of positive doping samples per confederation in 2004 and 2005 (excl. T/E)

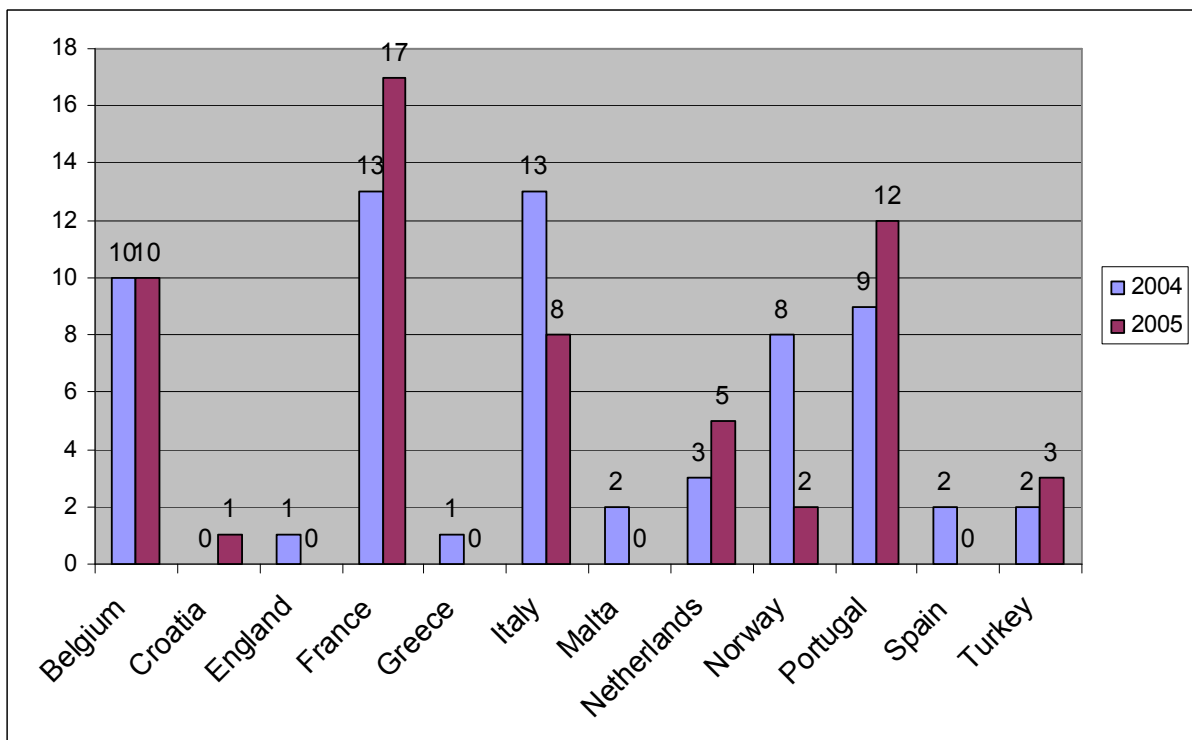


Figure 3: FIFA statistic of positive doping samples for Europe in 2004 and 2005 (excl. T/E)

Following FIFA's meeting with representatives of the Olympic Team Sports Federations and the WADA accredited laboratories in 2003, reliable data on performed analyses of doping samples could be received from the WADA-accredited laboratories (**Figure 4**). It was observed that samples performed for football showed quite a discrepancy between laboratories in Seoul with 42 analyses and Rome with 4 159 analyses. The total number of football samples analysed worldwide during the year 2004 allows the calculation of incidents for the positive samples in

total (0.42%), the distribution and calculation of incidents in the different confederations (**Table 1**), and the calculation for the most commonly detected prohibited substances (**Table 2**).

It is important to note that these statistical analyses, in contrast to the WADA statistic, include only positive samples and neither the applications for Therapeutic Use Exemptions nor pending Testosterone/Epitestosterone-ratio cases. These cases are extremely difficult to manage.

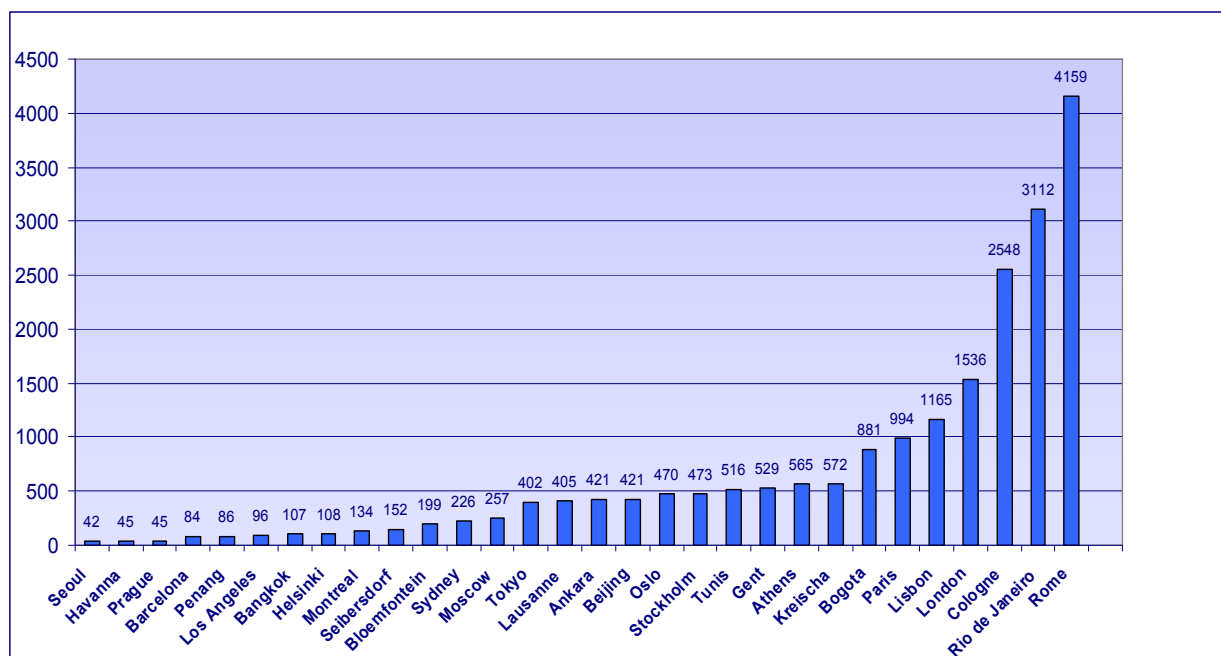


Figure 4: Samples analysed per WADA-accredited laboratory in 2004

	Samples	Positive	Incidence %
AFC	1,058	4	0.38
CAF	715	2	0.28
CONCACAF	275	0	0.00
CONMEBOL	3,993	17	0.42
OFC	226	1	0.44
UEFA	14,483	64	0.44
Total	20,750	88	0.42

Table 1: WADA-accredited laboratories' doping statistics for 2004 per confederation (excl. T/E)

Samples	Incidence%
37 Cannabis	0.18

30 Cocaine	0.14
14 Anabolic Steroids	0.07
3 Stimulants	0.01
4 Miscellaneous	0.02
Total 88	0.42

Table 2: Substance per positive sample of WADA-accredited laboratories in 2004

The relatively low incidence of positive doping samples, especially for the true performance enhancing drugs such as anabolic steroids and stimulants, supports the assumption that there is no evidence of systematic doping in football. This assumption was confirmed by UEFA during the 2005/2006 Champions League competition, when all 32 participating teams underwent unannounced doping controls in their training camps: Ten players per team were tested by UEFA medical doctors and all 320 samples were declared negative.

The FIFA database for management of all samples worldwide has proven to be an extremely useful tool for following up on cases with the aim of having the final decision of the member association's disciplinary committee no later than 90 days after the analysis of the B sample. It will allow a continuous cross-check with the WADA ADAMS – Anti-Doping and Management System in future and investigate into the sanctions related to the different substances and the severity of the violation.

List of prohibited substances

Like most major sports governing bodies and the IOC, FIFA has drawn up a list of prohibited doping substances and methods. The categories follow the Prohibited List International Standards in the World Anti-Doping Code. The most recent Doping Control Regulations and list of banned substances is divided into three main sections containing different categories of prohibited drugs and methods (**table 3**).

The 2006 list includes specific substances that are monitored as they are particularly susceptible to unintentional doping because of their general availability in medical products or because they are less likely to be successfully abused as doping agents. A doping violation involving such substances may result in a reduced sanction provided that the *“athlete can establish that the use of such specified substances was not intended to enhance sports performance”*.

Prohibited Substances	Prohibited Methods	Substances and Methods Prohibited in Competition
Anabolic Agents	Enhancement of Oxygen Transfer	Stimulants
Hormones and related substances	Chemical and Physical Manipulation	Narcotics
BETA-2-Agonists	Gene Doping	Cannabinoids
Agents with Anti-Estrogenic Activity		Glucocorticosteroids
Diuretics and Other Masking Agents		

Table 3 –Categories of banned substances and methods from FIFA Doping Control Regulations

An extensive list of examples for each category of prohibited substances is provided by FIFA in the annual Doping Control Regulations. These lists are always followed by the words *"and other substances that have a similar chemical structure or similar biological effect"* to include all related substances.

Some of the categories are more capable of enhancing a player's performance than others and, as such, may well be used within our sport. Whereas **narcotic analgesics**, mainly from the opiate family such as morphine, and **diuretics**, which are used as masking agents in certain sports, are contraindicated for the type of exercise that footballers have to perform on the field over 90 minutes. Doping substance categories that could involve footballers include **stimulants**, **anabolic agents** and **peptide hormones**.

Difficulty of out-of-competition tests in football

Out-of-competition controls have not been performed routinely in football, mainly because the professional football player is "in competition" for almost the entire year with the exception of brief seasonal breaks or when rehabilitating after severe injury.

Prior to EURO 2000, FIFA and UEFA for the first time produced a joint set of regulations for out-of-competition doping controls. About one month before the tournament, all competing countries were informed that unannounced doping controls might be carried out at training camps. After lots had been drawn to select four national teams, two doping control coordinators, one from UEFA and one from FIFA, visited the training camps in question at around 11 a.m. The head of delegation was requested to find a suitable location for collecting the required samples. The four players to be tested were then drawn by lots and the doping control performed immediately thereafter.

This experience showed the need for a much greater level of cooperation between associations, confederations and FIFA to bring the procedures for standard doping controls and unannounced out-of-competition controls more closely into line. A similar procedure was followed during the training camps prior to the FIFA World Cups™ in Korea/Japan and Germany™ as well as the Euro 2004 in Portugal. The procedure proved to be feasible and the compliance of involved teams and individual players was 100%.

Why Doping Control Officers should be doctors

Although some sporting organisations and anti-doping agencies continue to employ doping control officers (DCO) who are not medical doctors, FIFA and its member confederations insist on physicians. Firstly, players from teams undergoing a doping test are required to provide details of any treatment with medication from seven weeks to 72 hours before the test. All medications that a player has received must be listed together with details of the method of administration, dosage and medical indications. This information is covered by patient confidentiality and may not be communicated to non-medical persons (for example, the general secretary of the football association, the player's coach or a club's general manager) unless the sample tests positive. Therefore, for confidentiality reasons alone, a doping control officer needs to be a physician with appropriate qualifications.

Secondly, clinical studies show that until recently, most of the doping substances were drugs developed for medical therapeutic purposes. Today, however, an increasing number of substances are being developed for the sole purpose of doping and no studies have been conducted into their clinical effectiveness. Hence, the doctor not only has to carry out the control procedure, but also has an educational function before, during and

after the doping control. This is a final reason why specially trained physicians, working in close co-operation with laboratory specialists, should serve as doping control officers.

FIFA Network of Doping Control Officers

In order to make doping control more cost-effective, the FIFA Congress followed the recommendation of the Sports Medical Committee that DCOs should be, by profession, physicians who follow the Hippocratic Oath and their professional law. The FIFA doping control procedure is straight forward and transparent, leaving no place for cheating or wrong-doing. This makes the logistics easier and significantly reduces the costs involved, particularly at qualifying matches for major competitions.

Over the past twelve years, the FIFA Medical Assessment and Research Centre (F-MARC) has, in cooperation with the confederations and associations, developed a worldwide network of more than 250 physicians who act as FIFA Doping Control Officers. They have all attended instructional seminars conducted by F-MARC and the FIFA Doping Control Sub-Committee. These specialists carry out doping controls at national, international and FIFA competitions, but are involved in education within the confederations and member associations, too. These physicians, following their Hippocratic Oath as well as their professional and ethical values, play key roles in FIFA's long-term strategy in the fight against doping. Many of them are also team doctors.

Medications containing prohibited substances

In order to guarantee appropriate therapeutic treatment of a player who suffers from acute or chronic disease or injuries, drugs containing prohibited, or partially prohibited, substances could be permitted in exceptional cases if:

- the player's health would be impaired if the prohibited drug were withheld;
- no performance enhancement could result from the prohibited substance being administered as medically prescribed;
- no permitted or practical alternative drug is available in place of the prohibited substance.

In such a situation, the player or his doctor must request an exemption by submitting a formal application to the FIFA Doping Control Sub-Committee. Strict confidentiality is guaranteed.

Chain of custody in doping analyses

The laboratories throughout the world that are in charge of doping analyses are all specialised and well-equipped institutions, empowered by their national sporting authorities to perform analyses on urine samples. WADA has established an accreditation system based on annual quality control checks of each laboratory meant to guarantee uniform quality of analysis. A total of 33 laboratories were fully accredited for 2005 (table 4).

Ankara (Turkey)	Warsaw (Poland)	Bogota (Colombia)
Athens (Greece)	Bangkok (Thailand)	Barcelona (Spain)
Beijing (China)	Bloemfontein (South Africa)	Cologne (Germany)
Gent (Belgium)	Helsinki (Finland)	Seibersdorf (Austria)
Havana (Cuba)	Kreischa (Germany)	Lausanne (Switzerland)
Lisbon (Portugal)	London (England)	Los Angeles (USA)
Madrid (Spain)	Montreal (Canada)	Moscow (Russia)
Oslo (Norway)	Paris (France)	Penang (Malaysia)
Prague (Czech Republic)	Rome (Italy)	Seoul (Korea)
Sydney (Australia)	Tokyo (Japan)	Stockholm (Sweden)

Table 4 - FIFA/WADA accredited laboratories in 2006

International federations, including FIFA, use these official laboratories for their major events and competitions. The laboratory is obliged to comply strictly with the rules laid down in their medical codes. All samples are treated anonymously, each sample being labelled with a code number known only to the player and the committee in charge of the controls. This is essential to assure the player that the analyses are completely objective and to avoid any undue pressure on the laboratory when analysing the samples.

The results, either negative or positive, are communicated to the committee in charge. If the A sample is positive, the test is performed a second time before the result is sent. A copy from the report of any confirmed positive case is simultaneously sent to the confederation, FIFA and to WADA. The committee in charge then informs the player, who has a limited time to request an analysis of the B sample.

Analyses

The analyses are carried out with the aim of identifying all detectable banned substances. The equipment used is state-of-the-art technology designed to generate a "molecular fingerprint". The techniques of choice are combined analyses: Chromatography is the first step, consisting of a preliminary separation of the several natural or non-natural substances contained in each urine extract. After the substances have been sorted, a mass spectrometer provides a picture of the molecular structure that can be compared with others stored in the computer.

The overall aim is to prove that no banned substances are present in the urine samples provided by "clean" players: this is the vast majority, called a true negative. In positive cases, the same technology must also deliver absolute chemical proof that a banned substance or its degradation products, called metabolites, are present in the urine: this is a true positive. Every possible step is taken to prevent samples from erroneously being declared positive: this would be a false positive. The purpose of B sample analysis in presence of the player or one of the player's representatives is to provide confirmation of the result obtained during the A test.

Unfortunately, not all banned substances used in sport can be detected by this technology, leaving a possibility of so-called false negatives. In addition, some substance have exactly the same structure as their natural forms produced in the body and are quite difficult to tell apart.

What means T:E Ratio?

Widespread use of anabolic steroids in doping began in the 1980s and testosterone was one of the preferred agents. Until recently, it was difficult to differentiate between synthetic and natural testosterone in the body. The only method available was a quantitative one involving the establishment of a ratio with another steroid called epitestosterone that is similar to testosterone and is very stable in its concentration. The normal Caucasian and African male has a mean testosterone to epitestosterone = T:E ratio of 1.5:1 with some variability, rising to 4:1 in very rare cases. The mean ratio for Asian people is generally lower than 1:1. A player with excessive levels of testosterone will show a much higher ratio. It was decided that the maximum permissible T:E ratio would be 6:1, and that any ratio over this limit would be declared positive. Later, the limit for an adverse finding has been fixed at 4:1.

In addition, monitoring of the complete steroid profile of the athlete over time can demonstrate a manipulation. Today, a laboratory's use of new instrumentation, the isotope ratio mass spectrometer (IRMS), allows a differentiation between steroids of endogenous origin from those of exogenous origin. This, may be together with the retrospective values and, in some cases, additional endocrinologic investigations, allow the disciplinary committees to make the most accurate decision in a timely manner.

Nandrolone

Just before the FIFA World Cup™ in France in 1998, a number of well-known players tested positive for small amounts of nandrolone metabolites in their urine. Nandrolone is an anabolic steroid often used in body-building. This compound is taken in high doses and its degradation products remain detectable in urine for up to several months.

In the same year, a study showed that some football players had nandrolone metabolites in their urine after the game. The traces of metabolites in those players' urine samples were very small and all were below the limits of a positive reading. Later, extraordinary variability in the excretion was demonstrated, making the relationship between dosage, time delay and the urine concentration very critical. Further investigation into this matter is needed.

Erythropoietin (EPO)

The use of erythropoietin (EPO) in sport can be detected in urine by a novel method based on biochemical properties of the substance. EPO and analogues are too large to be filtered by the kidney and eliminated in urine. Their concentrations in urine are so low that there was a need for improvement in technology to allow the detection of this product. In 2000, the laboratory in Paris implemented a method based on a subtle structural difference between recombinant and natural EPO. This method is now applied in several accredited laboratories in the world.

Human Growth Hormone (hGH)

The chemical structure of bioengineered human growth hormone is almost identical to the natural hormone produced in the body. Consequently, it is particularly difficult to differentiate between injected and natural hormone. Recently developed methods use blood as a biological sample for the determination of a specific ratio diagnostic for the use of recombinant hGH. This new approach clearly demonstrates the necessity to implement blood sampling for anti-doping purposes in future.

Blood sampling

Recently, blood has been introduced as an alternative biological matrix to urine for anti-doping purposes. Since 2004, blood has been recognised as absolutely necessary for reliable results for some forbidden substances and methods. Currently, hGH, synthetic haemoglobins and homologous blood transfusions can be reliably detected in blood. Some other blood tests are also carried out in certain sports, not for the purpose of determining the presence of doping, but rather as general health checks conducted in the context of medical screening of the competitors. This has potential for the future and could easily be introduced by some national or international federations depending on their structural organisation. However, this concept is more difficult to implement in larger federations where there are players on every continent.

Research helps football and footballers

The current list of banned substances contains a number of drugs for which there is no conclusive scientific evidence to justify inclusion on the list. Research on selected substances has

highlighted some performance-enhancing effects while other references are doubtful. In view of the potentially enormous repercussions there are several ways of improving the current situation:

- A database containing all currently listed substances should be set up. This should give details on the pharmacological background, research findings and clinical papers documenting the effects of the particular substance;
- Borderline substances should be reconsidered on the basis of research studies that provide a scientific analysis of their effect on physical and psychological performance as well as their effect on metabolism;
- A standard study design (double-blind, randomised trials) should be set up for the substances under scrutiny, proven in pilot projects and implemented multi-centrally;
- The results of such studies should form the basis for a future discussion on the list of prohibited substances;
- Tracing and identification of masking agents.

Such research work might help to reduce the list of banned substances and allow us to focus on the major problem areas like anabolic steroids, peptide hormones and related substances.

Research into nandrolone metabolism in footballers, conducted with FIFA's support, documents the complexity of the problem. A study showed that current laboratory methods cannot distinguish between nandrolone from metabolism and intake of nandrolone. Although the cut-off level of 2 ng/ml would appear rational, it has not been scientifically proven, leaving the window wide open for discussion. Further scientific evidence is needed to end the ongoing speculation. Nevertheless, for the time being, this cut-off level is valid and will remain in effect.

FIFA has realised and documented its responsibility by supporting research studies that promise to enhance current medical knowledge. A combined effort with other international sports federations, the IOC and anti-doping agencies might, however, accelerate the process.
