

Medical science helps UK athletes reach peak performance

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A new hand-held medical device will help UK athletes reach the top of their game when preparing for upcoming sporting competitions. UK Sport, the UK's high performance sports agency, has reached an agreement to become the first organisation to use cutting edge technology developed by Argento Diagnostics to improve training programmes for athletes.

Elite athletes will be able to monitor various proteins which reveal details about the condition of the body – known as biomarkers – before, during and after training sessions. These biomarkers can give a clear indication of their physical health and the effectiveness of a particular training programme. Everyone reacts differently to training, so understanding how activities affect the body helps ensure that athletes follow the best programmes for them and avoid injury. This is particularly important for elite level athletes, where small changes in fitness can mean the difference between success and failure.

These biomarker tests are currently carried out at centralised laboratories. However the time taken to send samples to the laboratory and receive the results can limit the benefits.

Argento Diagnostics – a spin out of the National Physical Laboratory, the UK's National Measurement Institute – has developed a rapid diagnostic technology to solve this and other problems associated with slow clinical laboratory diagnosis. Argento's hand-held device provides a quick, full diagnosis from a single small sample (such as blood, urine or

saliva), returning results within minutes. As well as providing real time data for training, the results can also quickly identify injuries or medical conditions, enabling rapid treatment before long-term damage can be done, and therefore increase chance of a quick recovery.

Argento's portable device uses nanotechnology to analyse the sample. The sample is mixed with silver nanoparticles coated with a binding unit, an antibody, against a specific biological compound, the biomarker, which is indicative of the condition being tested for. If the biomarker is present the silver nanoparticles will stick to magnetic beads with the biomarkers sandwiched in-between.

Magnets pull these compounds into the measurement zone, where the silver nanoparticles are dislodged off, drawn down to the sensor and measured. The number of nanoparticles measured by the sensor will be directly proportional to the expressed amount of biomarker. The device can therefore quickly analyse the biomarker level and, using a computer programme, summarise it in a meaningful way on an on-screen readout.

The collaboration with UK Sport, which is also co-funded by the English Institute of Sport (EIS) and the Scottish Institute of Sport (SIS), will give the UK's leading athletes access to Argento technology. Dr Scott Drawer, Head of Research and Innovation at UK Sport, said: "UK Sport supports world class athletes to increase their chance of success on the international sporting stage. The availability of this real-time monitoring will enable training to be customised not only to the individual but also to their current condition, marking a huge step forward in preparing our athletes for future success."

Dr Ken van Someren, Director of Sport Science at EIS, said: "EIS practitioners work on the frontline delivering expertise on a daily basis in training and competition. Every aspect of training and preparation plays an important role in maximising performance when it matters

most. This technology helps the depth in understanding our practitioners offer but also the speed at which we are able to feedback to athletes and coaches in order to give meaningful insights during preparation."

Mike Whittingham, Director of High Performance & SIS said "At the sportscotland high performance institute we are delighted to be a key partner in this exciting project led by UK Sport and Argento. We see this as an exceptional opportunity to help shape and influence current and future thinking around training and competition loads with the ultimate aim of improving the performances of all our athletes."

Keith Page, CEO of Argento Diagnostics, said: "This technology was developed to provide quick and simple diagnosis of a board range of conditions. The deal with UK Sport will allow a dramatically increased understanding of how the human body works when being pushed to its limit and we can use that information to continue to improve physical performance. This is a great example of the UK's world-leading science expertise supporting our world-leading sportsmen and women."

The agreement marks the first commercial use for Argento's technology. The device also has the potential to save lives by providing rapid diagnosis of a wide range of medical conditions, from cardiac damage to swine flu, allowing faster delivery of treatment. It has huge implications for emergency treatment as well as veterinary, bio-defence and environmental applications. Argento are in talks with several organisations in all these areas.

Provided by National Physical Laboratory

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