Investigating the use of a Point of Care sIgA test within the sporting environment

Joe Dunbar, Ahmed Jehanli & Sharon Skelhorn. IPRO Interactive, Wallingford, UK.

Introduction

The use of salivary diagnostics within the sporting community has gathered momentum in recent years; identifying hormone levels to assist in the optimisation of workloads, or antibodies such as sIgA to assess individual recovery status and potential immune suppression. Immediate feedback for coaching and support staff via a Point of Care test would give a significant time advantage over standard laboratory techniques, which often reveal data to sporting squads only days later. This paper assesses a new point of care product for the rapid determination of sIgA in comparison to standard laboratory ELISA determination.

Methods

A total of 208 saliva samples were taken from a cohort of 21 English Premier League soccer players (26.4 ±4.2 yrs) using IPRO OFC collection kits. The OFC kits collect 0.5mL of oral fluid and contain a volume adequacy indicator, giving collection times typically typically in the range of 20-50 seconds. The samples analysed in this study were taken during routine monitoring: before training sessions, as well as before, straight after and the day after Premier League matches, thus giving a wide range of concentrations. The same samples were assessed to determine sIgA concentrations via laboratory ELISA and a real-time Lateral Flow Device (LFD). For the LFD, two drops of saliva/buffer mix are added to the sample window of the LFD cassette. The liquid runs the length of the test strip via capillary action creating a control and test line visible in the test window. Five minutes after the sample is added the test line intensity is measured in an IPRO reader. The test line intensity is inversely proportional to the SIgA concentration in the sample.
In both methods a variety of batch Lot Numbers were used.

Figure 1: The IPRO OFC

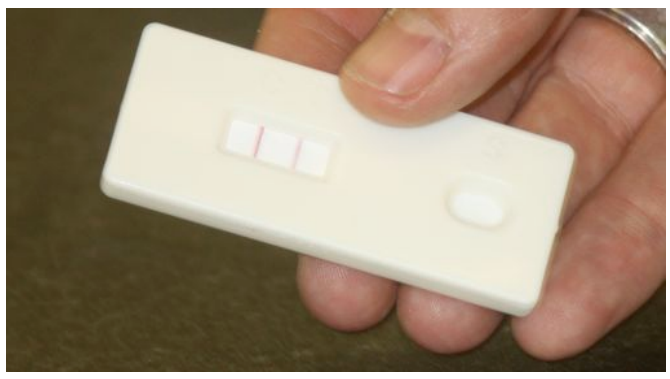

Figure 2: IPRO LFD with control and test line

Results

sIgA concentrations measured via ELISA ranged from 43.9-598.8 µg/ml and with the LFD from 27.7-628.0 µg/ml, with the mean difference 23.22 µg/ml. The relationship between the sIgA values obtained using the ELISA and LFD is shown in Figure 2 and was represented by the formula:
$y = 1.011x + 30.5$, with R^2 0.757.

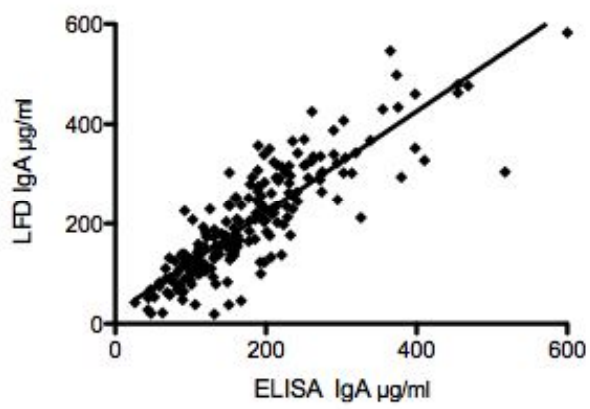

Figure 3: Relationship between sIgA determination from ELISA & IPRO LFD

Variability was seen to be reduced when batch Lot Numbers were constant as shown in Figure 4, where 36 samples were analysed on one ELISA plate and using one batch of LFDs.

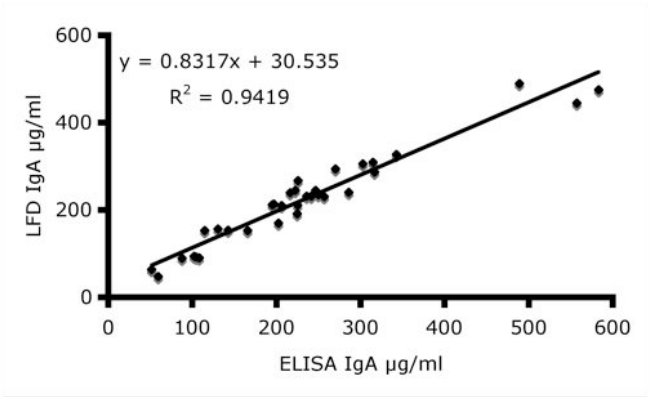

Figure 4: Relationship between sIgA determination from ELISA & IPRO LFD

One of the most important aspects of such technology for the applied users is the repeatability of measurement. Athletes are more concerned about how their readings vary on a longitudinal basis, rather than how the LFD performs in comparison to the ELISA (which is far from a gold standard in its own right). In this regard the IPRO device was seen to perform well, when the same samples were measured on two separate occasions 5 days apart (Figure 5). The mean cv was 8.5% (range 0.6-18%), comparable to the ELISA method mean cv 8.5% (range 1.8-17.4%)

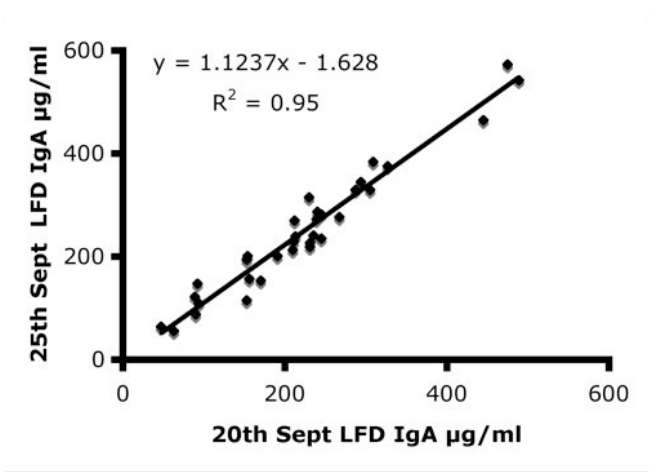

Figure 5: Repeatability of LFD measurement, same sample 5 days apart

Conclusion / Practical Implication

The point of care test shows good agreement with the ELISA method for the determination of sIgA. Given the quick data turnaround and efficiency in terms of cost, it represents a suitable alternative method for use in sports teams. Given the fact that sIgA concentrations can now be performed on site, in the training environment; this test represents a true paradigm shift in the way athletes can be monitored, in that results are gained within seven minutes and subsequent intervention strategies can be applied immediately where appropriate.

Figure 6: The IPRO product range

Innovation Centre
Howbery Park
Benson Lane
Wallingford,
0X10 8BA, UK

IPRO•INTERACTIVE

www.iprointeractive.com
joe.dunbar@iprointeractive.com
01491 822622
07889 920473