

Project Review

“Confirmation of differentially expressed genes associated with autologous transfusion”

M. Ashenden, (SIAB Research Pty Ltd, Surfers Paradise QLD, Australia), **S. Easteal**, **R. Williams**, **J. Henderson**, (John Curtin School of Medical Research, Australia)

Our previous research has found compelling evidence that gene expression profiles are significantly altered one week after receiving an autologous blood transfusion. These data were generated using a microarray that screened more than 54,000 different genes. The aim of this project is to identify, from amongst the hundreds of genes that were differentially expressed, the most reliable set of candidate genes for use as a diagnostic to identify autologous transfusion by athletes.

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Results and Conclusions

Following on from our initial results which showed compelling evidence that blood transfusion produced large changes in blood gene expression profile, we have demonstrated that these results can be replicated in a separate subject cohort, and using different microarray chips.

After reinfusion of three bags of blood, gene expression differences were most evident 7 days post-reinfusion, remained strong at 14 days and persisted through to 28 days. There was an indication that a change does occur following transfusion with one bag of blood, but of much smaller magnitude.

In order for gene expression to be a useable diagnostic in the context of antidoping:

1. Additional work is required to determine whether other genes show detectable signals in response to lower quantities of blood;
2. Reference genes expressed at a uniform level in different individuals under different circumstances must be identified to enable measurement of candidate genes relative to a standard;
3. Variability of the candidate and reference genes must be established in an elite athlete population under typical training/environmental scenarios.