GENETICS

A NEW ANALYSIS METHOD FOR BLOOD DOPING

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I have been deeply disappointed this summer when I heard that Jan Ullrich will not participate at the Tour de France 2006 (although there are many more athletes that I am watching – I wish him all the best for the next year). Later on that year I heard a presentation in Bern about blood banking – how cells struggle to survive after leaving the body – and of course we did first gene expression experiments back in 2002.
So here is my idea how to identify autologous blood transfusion: Blood separated from the body will develop a unique RNA expression pattern that can be measured by conventional cDNA chips. Identifying this pattern – possibly only 10 upregulated RNAs – in the blood of an athelete could indicate autologous blood transfusion.
I guess that there will be only a minor chance to re-identify this pattern after retranfusion into the body as blood is being diluted around 1:30 and RNA being immediately degradaded.
However, some retransfused cells will probably maintain their death struggle program for some time leaving a good chance to profile them even after a couple of days if they have visited a freezer or not. Wikipedia is correct

> In the case of detecting blood transfusions, a test for detecting homologous blood transfusions (from a donor to a doping athlete) has been in use since 2000. The test method is based on a technique known as fluorescent-activated cell sorting. By examining markers on the surface of blood cells, the method can determine whether blood from more than one person is present in an athleteâ€™s circulation.
> …
> At present there is no accepted way of detecting autologous transfusions (using the athleteâ€™s own RBCs) but research is in progress and the World Anti-Doping Agency (WADA) has promised that a test will eventually be introduced. The test method and its introduction date are to be kept secret in order to avoid tipping off doping athletes..

A potential example application may be found in the literature – no need to keep this idea

secret as it will be nearly impossible to modify a particular gene expression pattern of a particular cell type.

Addendum 5/2/2010

Finally, the WADA recognizes the value of gene signatures in a new Science editorial.