

## PROJECT OVERVIEW

### *“Evaluation of DNA mixture detection in Dried Blood Spots as a detection method for homologous transfusion”*

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Blood doping and in particular transfusions were used by athletes for decades, as an easy way to increase red blood cells, oxygen transportation to muscles and endurance. Homologous transfusion (blood from a compatible donor) was the simplest method used.

However, in 2004 a method based on flow cytometry was implemented in anti-doping laboratory to identify homologous transfusion. While being efficient to identify around 2% stranger blood in a sample, it requires the use of many antibodies and still could lead to false negative results. Nowadays only few anti-doping laboratories are still running flow cytometry and athletes could feel free to come back to homologous transfusion.

With the development of forensic science, DNA has proven to be a reliable source of identification of the presence of two different DNA in a single blood sample. The power of amplification of DNA based techniques is sufficient to start from very small volumes and Dried Blood Spots (DBS) is an interesting matrix for the future of doping controls. The aim of the project is to evaluate the interest of implementing a new test to detect homologous transfusion by using a forensic DNA-based protocol on DBS for anti-doping purpose.

The objectives of the project are:

1. To validate the conditions to propose a robust protocol for detection of DNA mixture from Dried Blood Spots.
2. To estimate the window of detection after transfusion of healthy volunteers by analyzing DBS spotted from venous blood and to compare these results with those of the current flow cytometry method for detection of homologous blood transfusion.