

# **Title: Immunologic blood transfusion accidents: toward a complete compatibility test at the patient's bedside**

*Karine Charrière<sup>1</sup>, Alain Rouleau<sup>2</sup>, Audrey Guitton<sup>2</sup>, Pascal Morel<sup>3</sup>, Véronique Bourcier<sup>4</sup>, Christian Pieralli<sup>2</sup>, Wilfrid Boireau<sup>2</sup>, Lionel Pazart<sup>1</sup> and Bruno Wacogne<sup>1,2</sup>*

<sup>1</sup>INSERM CIC 1431, Besançon University Hospital, 25000 Besançon, France

<sup>2</sup>FEMTO-ST Institute, UMR CNRS 6174, Univ. Bourgogne Franche Comté, 15 B Avenue des Montboucons, 25030 Besançon cedex, France

<sup>3</sup>Etablissement Français du Sang Bourgogne/Franche-Comté, 25000 Besançon, France

<sup>4</sup>Hemovigilance Service, Besançon University Hospital, 25000 Besançon France

## ***Abstract***

In most countries in order to ensure the transfusion safety, a direct compatibility test between the red cell concentrate and the receiver's blood is performed (crossmatch prior any blood transfusion). In some countries (like France), an ultimate ABO compatibility is required, the test is performed at the patient's bedside and crossmatch is only performed for patients who present irregular antibodies. Up to now, and whatever the country, no complete solution is able to detect an immunological conflict at the patient's bedside and to prevent 100% of incompatible transfusions.

In this conference, we will show how antibodies grafted biochips can be used address this issue. Biochips are placed in disposable cartridges which are inserted in a mobile reader/actuator integrated in the transfusion line. We will detail the biochip, cartridges and medical demonstrator fabrication. Detection of the compatibility (or incompatibility) situations is based on a simple optical absorption technique.

Experimental results concerning the ABO and Rhesus factor compatibility using various immunologic biochips will be presented before showing how this biochip technology could be used for performing a direct blood-to-blood crossmatch at the patient's bedside. As a conclusion, we will suggest an idea where only one, non-multiplexed, biochip could be used to address all the causes of immunologic red cell incompatibilities.

## ***Biography***

Bruno Wacogne is a CNRS Research Director at the FEMTO-ST Institute (UMR CNRS 6174) where he is leading the transversal axis Biom'@x concerning Sciences and Technologies for a Translational Medicine. He is also the technological coordinator of the Clinical Investigation Center of Besançon University hospital (INSERM CIC1431) where he is leading the Microsystems and Biological Qualification team. His research interests are micro technologies, optics, translational research, biological qualification and immune-combined medical devices. He is the author or co-author of nearly 200 communications and 10 patents among which 2 concern the subject of his talk. He has been awarded twice in international events, one in micro technology, the second on in the field of transfusion safety.