

Board of examiners

Prof. dr. Bernard Canaud

Department of Nephrology
Université de Montpellier

Prof. dr. Pierre Delanaye

Department of Nephrology
Université de Liège

Prof. dr. Björn Meijers

Department of Nephrology
Katholieke Universiteit Leuven

Prof. dr. Erik Debing

Department of Vascular Surgery
Vrije Universiteit Brussel

Prof. dr. Sabine Allard

Department of Internal Medicine
Vrije Universiteit Brussel

Prof. dr. Sylvie De Raedt

Department of Neurology
Vrije Universiteit Brussel

Prof. dr. Leo van Grunsven, Chair

Life Sciences and Medicine and Liver Cell Biology research group
Vrije Universiteit Brussel

Prof. dr. Karl Martin Wissing, Promoter

Department of Nephrology
Vrije Universiteit Brussel

Prof. dr. Kristin Jochmans, Promoter

Department of Hematology
Vrije Universiteit Brussel



PhD in Medical Sciences
2020-2021

INVITATION to the Public defence of

Karlién François

To obtain the academic degree of '**DOCTOR OF MEDICAL SCIENCES**'

**The hemodialysis circuit unclogged:
understanding clotting during hemodialysis in the
quest for a hemodialysis strategy without systemic
anticoagulation.**

The defence will take place on Wednesday, 9th June 2021 at 5 p.m.

and will be organised online

via Zoom meeting, accessible through the following link:

https://gf.vub.ac.be/redirects/PhD_defense_Karlién_François.php

and in Auditorium Piet Brouwer

ADMITTANCE to the auditorium will only be granted upon presentation of the personal invitation from the PhD candidate.

Summary of the dissertation

Hemodialysis is a life-saving treatment for patients suffering from kidney failure. It allows the removal of toxins and water by connecting the patient to an extracorporeal artificial kidney, the dialyzer. Routinely, anticoagulants prevent blood clotting within the blood circuit that connects the patient to the dialyzer. These medications increase bleeding risk of the patient and are associated with metabolic and inflammatory disturbances.

This PhD thesis explores coagulation activation during hemodialysis and evaluates a novel method of hemodialysis avoiding systemic anticoagulation.

Our data documented frequent over-use of anticoagulants in a cohort of patients receiving chronic hemodialysis. In spite of efficient anticoagulation, we showed a delay in thrombin generation during hemodialysis without a detectable contact system activation. These results support the hypothesis that activated platelets and leucocytes are the main drivers of thrombin generation during hemodialysis.

A novel hemodialysis set-up combining a heparin-grafted dialyzer with a citrate-enriched dialysate avoids systemic anticoagulation. It was highly successful for hemodialysis of critically ill patients presenting an increased bleeding risk. A randomized controlled trial in prevalent dialysis patients confirmed non-inferiority of this dialysis strategy compared to hemodialysis using systemic anticoagulation in terms of dialyzer performance. Nevertheless, the avoidance of systemic anticoagulation during hemodialysis was associated with more circuit clotting and more thrombin generation.

Our findings help to optimize the anticoagulant strategy during hemodialysis and to improve the care for patients treated with hemodialysis.

Curriculum Vitae

Karlien François received her MD degree in 2007 at the Vrije Universiteit Brussel, Belgium. After an internal medicine and nephrology training in Belgium, she completed a Home Dialysis Fellowship at University Health Network Toronto, Canada. Since 2015, she works as a nephrologist at Universitair Ziekenhuis Brussel where she leads the home dialysis program.

Dr. Karlien François received research grants from the Research Foundation Flanders and the UZ Brussel Willy Gepts Fund to assess coagulation activation during hemodialysis and to explore hemodialysis strategies avoiding systemic anticoagulation.