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## PhD Research Activities

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### Development of a bioactive membrane for bioartificial kidney device

#### Aim of WP3

In the context of the enhancement of filtration of protein bound toxins in Akute Kidney Injury patients, my project focuses on the development of bioartificial kidney device, a hybrid combination of artificial hollow fiber membranes and renal cells. The membrane should be antifouling on one side and support cell growth on the other side, it should allow protein bound toxins to reach the cells, and protect the latter from immune system. One part of the project focuses on achieving a bioactive membrane surface to allow on the one hand the optimal membrane selectivity and on the other hand the needed renal cell monolayer formation. The second part of the project aims at building an upscaled bioartificial kidney prototype, using hollow fiber modules bioreactor.

#### Development of Bioartificial kidney prototype

During the first year of the project, commercial hollow fiber membranes of different sizes have been functionalized for improved cell adhesion. Cell culture experiments are in progress using a dedicated bioreactor.

#### In a bigger picture

The development of a bioartificial kidney (BAK) device is foreseen as a solution for removal of protein bound toxins and possibly achievement of other kidney functions, which are missing for patients having Acute Kidney Injury or Chronic Kidney Disease. The BAK could come as a stand-alone treatment or complement haemodialysis.