



## 6. AneuX – Better predictions for the treatment of aneurysms

Intracranial aneurysms are weak spots on the brain's blood vessels that swell and fill with blood. Usually, they present no symptoms and cause no discomfort. If, however, the aneurysm bursts, the consequences can be very serious. The researchers working on the MRD Project AneuX are therefore striving to develop a tool that provides a reliable prediction for an aneurysm's development.

Benign intracranial aneurysms are quite common and mostly harmless. But if the wall of the blood vessel ruptures, the subsequent brain hemorrhage leads to death in a third of cases, and in another third to severe, irreversible brain damage. Only the remaining third of patients are able to partially recover. People of all ages can be affected. "It is estimated that aneurysms occur in around 3% of the population, but the risk of brain hemorrhage cannot yet be determined," says Philippe Bijlenga, medical doctor and researcher at Geneva University Hospital, and principal investigator of the AneuX project.

There are currently no available methods by which the development of aneurysms, or the success of surgery or treatment, can safely be predicted. However, it is postulated that the shape of an aneurysm might give a clue to the disease prognosis. The team behind the MRD Project AneuX is therefore looking into the morphological characteristics of aneurysms in search of visual biomarkers. To do this, the scientists have access to a database that has been continually updated since 2006. It contains data from over 700 patients and 900 aneurysms, chronicling their development over time. The morphological data was collected by means of frequent image

screenings, resulting in 3D records of a great number of different aneurysm variations at different stages of disease.

The AneuX team is pursuing two different approaches in the morphological characterization of aneurysms. "In Geneva, we're examining the biological processes, whereas researchers at the ZHAW are creating a cellular model," says Bijlenga. A model for the prediction of disease progression is to be

developed based on the simulation and data from the clinical part. This model will then be tested in a clinical trial. "I am quite confident that, by the end of the project, we will have a tool that will be able to predict the potential development of an aneurysm based on its shape," declares Bijlenga. For the medical doctor, it's important that the implementation of such a tool should be as simple and straightforward as possible.

### AneuX at a glance

**Principal investigator:** Dr. med. Philippe Bijlenga, Department of Clinical Neuroscience, Geneva University Hospital

#### Research groups:

- Prof. Sven Hirsch, Institute of Applied Simulation, ZHAW
- Prof. Niels Kuster, Foundation for Research on Information Technologies in Society (IT<sup>2</sup>S), ETH Zurich
- Prof. Brenda Kwak, Department of Pathology and Immunology, University of Geneva
- Prof. Brigitte von Rechenberg, Center for Applied Biotechnology and Molecular Medicine, University of Zurich
- Prof. Daniel Rüfenacht, Center for Applied Biotechnology and Molecular Medicine, University of Zurich

**Approved SystemsX.ch funds (2015–2018):** CHF 1.875 million



**AneuX**  
Shape as Biomarker  
for Aneurysm Disease