

## **Cardiac and Vascular Phenotyping of Genetically Modified Mice**

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**Project Description:** The overall aim of this post-doc programme is to establish a broad methodological mouse-physiology platform. We will study how environmental factors interact with the genetic background to produce pathologies and systemic cardiovascular disease. The platform will, with a range of techniques, study the complex integration of neural and hormonal influences on vascular and cardiac function at the level of the whole organism. The specific aims are: i) Learn and "import" novel techniques to study cardiac function *in vivo*. These techniques are (a) Echocardiography, which is a key method to study cardiac function *in vivo*. The different parameters that can be measured with this technique are e.g. ejection fraction, fractional shortening, wall thickness and different flow and volume parameters in the heart. (b) Cardiac catheterization and Langendorf heart perfusions. The method is used to measure flow and pressure directly in the two chambers of the heart. This can be done both in the anaesthetized mouse and in *ex vivo* preparations of the beating, artificially perfused mouse heart. The technique is invasive in its nature but allows for more specific determination of cardiac function. Cardiac catheterization is an important complement to echocardiography. ii) Learn and "import" novel techniques to study vascular function *in vitro* i.e. pressure myograph. iii) Develop cardiovascular disease models that can be applied to genetically engineered mice. Three different hypertensive models will be established, two kidney one clip i.e. renal hypertension, aortic banding and deoxycorticosterone acetate plus salt (DOCA-salt).  
In conclusion, techniques are available to genetically modify such a complex animal as the mouse. However, caution must be used when interpreting the results from mutated mice. The studied phenotype is a combination of knocked-out or over-expressed function and secondary compensatory changes. Careful studies of the mouse phenotype should be carried out and a critical analysis of the results is needed. It is therefore of utmost importance to develop advanced techniques to be able to study the physiological phenotype of genetically engineered animals.