Cardiovascular dysfunction after cancer radiation therapy: Search for biomarkers and study of the underlying physiological mechanisms

Short project description
The increasing effectiveness of multimodality cancer treatment, including surgery, chemotherapy, and radiation therapy, has significantly improved the outcome for many cancer patients. However, this also implies that long-term side effects induced by therapy have become an important issue. **External beam radiation therapy (RT)** plays an important role in the management of **patients with cancer**. For instance, in breast cancer RT also covers part of the heart and major blood vessels. Moreover, low to moderate radiation doses associated with RT have been correlated with an **increased cardiovascular morbidity and mortality**.

In the framework of the recently launched European Horizon2020 project MEDIRAD, we will explore **DNA methylation patterns** as relevant biomarkers of radiation-induced cardiovascular damage. To this end, we will first identify DNA methylation patterns in blood samples of animal models exposed to ionizing radiation. Next, the developed biomarker panel will be cross-validated in blood samples from breast cancer RT therapy patients. In parallel, we will study the effect of low-dose radiation on **vascular reactivity and associated vascular stiffness in animal models**. Ex vivo studies in organ baths will enable to evaluate vascular reactivity of blood vessels and to explore underlying mechanisms. In addition, in vivo measurements such as tonometry (to assess carotid-femoral pulse wave velocity which is a reliable marker of vascular stiffness) and echocardiography will be explored to develop functional biomarkers with potential for translation towards patients.

Taken together, this research project aims to identify a set of **predictive biomarkers** for a more accurate risk estimation for early and late radiation-induced cardiovascular events, as well as to provide potential targets for **potent countermeasures**. As such we strive for a better life quality for ionizing radiation exposed people.

The minimum diploma level of the candidate
Master of sciences

The candidate needs to have a background in
Bio-engineering, Biology, Biomedical Sciences, Pharmacy
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Website links:

Before applying, please consult the guidelines for application for PhD at:

Application deadline:
March 27, 2018