



## SIMON, DEYCMAR

Laboratory of Applied Radiobiology  
Department of Radiation Oncology  
University Hospital Zurich

### Address

University of Zurich  
Y23-K86  
Physiologie  
Winterthurerstr. 190  
CH - 8057 Zurich, Switzerland

Simon.deycmar@uzh.ch



**KEYWORDS** – Proton beam therapy, Photon Radiotherapy, DNA double strand break repair, combined chemoradiotherapy, homologous recombination repair

## MAIN FIELDS OF RESEARCH; ABSTRACT

More than 50% of all patients diagnosed with solid tumors currently receive radiotherapy alone or in combination with surgery and/or chemotherapy. The most common form of radiotherapy used in clinics employs high energy linear accelerators (LINACs) to generate and precisely target a photon beam to the tumor mass. On the other hand, particle beam therapy, especially proton based radiotherapy, as used at the Paul Scherrer Institute, has evolved in the past decades from a niche treatment to a valid option. A 10% higher efficacy of proton versus photon irradiation is already implemented in the clinics even though little is known about the radiobiology of the relative biological effectiveness (RBE). Since this RBE can significantly vary in different tissues, cells or end points, a deeper look into the underlying mechanism for proton induced cell killing is inevitable.

Previous research identified a differential requirement for the two major DNA double strand break (DSB) repair machineries in response to the two mentioned types of ionizing radiation. Thus, genetically defined cells with altered backgrounds of *non-homologous end joining* (NHEJ) or *homologous recombination repair* (HRR) will be investigated on their response to the respective irradiation. Results gained from in vitro experiments will then be converted to an in vivo setting of inducible repair deficient xenografts to draw a correlation between genetic background and the preferable irradiation or combined chemoradiotherapy approach.

## SPECIAL TECHNIQUES AND EQUIPMENT

Proton irradiation, clonogenic assay, nuclear repair foci staining, Western blotting