

Marie Skłodowska-Curie PostDoc Positions in Germany

“Expression of Interest” for hosting Fellows

This template should be used by institutions interested in hosting postdoctoral fellows within the Marie Skłodowska-Curie Individual Fellowship programme. Host institutions should be located in Germany.

1. Valid for the following MSCA-IF Calls¹:

<input type="checkbox"/> 2018	<input checked="" type="checkbox"/> 2019	<input type="checkbox"/> 2020
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2. Interested host institution:

Forschungszentrum Jülich GmbH
http://www.fz-juelich.de/portal/EN/Home/home_node.html

Name of EU liaison officer (EU-Referent/in), if applicable:

3. Institute/Department:

Department of Safety and Radiation Protection

Website (Hyperlink):

http://www.fz-juelich.de/gs/DE/Home/home_node.html

4. Contact person (name and e-mail address):

Burkhard Heuel-Fabianek
Head of Institute
b.heuel-fabianek@fz-juelich.de

Dr. Ralf Kriehuber (local supervisor)
Radiation Biology Unit
r.kriehuber@fz-juelich.de

¹ MSCA Individual Fellowships are selected on the basis of annual calls for proposals. Forthcoming and open calls for proposals can be found on the [Participant Portal](#) of the European Commission under “Funding Opportunities” and “Calls/H2020”.

5. Project idea/position (scientific requirements, topic, discipline):

Rough outline of idea/position:

The induction of targeted DNA double-strand breaks by Iodine-125 labeled Triplex-Forming-Oligonucleotides (TFO)

DNA-associated Auger electron emitters (AEE) possess high cell killing properties at overall very low cellular radiation doses and are, therefore, radionuclides of choice for targeted tumor therapy sparing radiation dose to non-targeted tissue.

Upon decay e.g. Iodine-125 (I-125) ejects numerous low-energy electrons (Auger electrons). The released energy is deposited in the very vicinity of the decaying radionuclide leading to a focal high ionization density. Therefore, I-125 is capable to induce complex DNA double-strand breaks when located within or close to the DNA. Most important, the induced DNA lesions are limited to only ~ 10 base-pairs within the decay site allowing *per se* the nano-targeting of genomic structures.

Triplex-Forming-Oligonucleotides (TFO) bind to the DNA double helix in a sequence-specific manner by forming a stable DNA-Triplex structure. Therefore, TFO allow the sequence-specific positioning of AEE in the genome. I-125-labeled TFO have proven to introduce DNA sequence-specific double strand breaks and cause enhanced cyto- and genotoxicity per unit radiation dose (see references).

However, the binding efficiency of TFO to their target sequence in a cellular environment is not yet fully understood. Therefore, TFO with different numbers of potential target sites in the human genome shall be studied in the project in order to elucidate the DNA-binding capacity and binding kinetics of TFO due to i) TFO composition, ii) target frequency and iii) target localization (e.g. eu- versus heterochromatin) in human tumor cell lines.

References:

Dahmen V, Schmitz S, Kriehuber R. Induction of the chromosomal translocation t(14;18) by targeting the BCL-2 locus with specific binding I-125-labeled triplex-forming oligonucleotides. *Mutat Res Genet Toxicol Environ Mutagen.* **2017** Sep; 823:58–64.

Dahmen V, Pomplun E, Kriehuber R. Iodine-125-labeled DNA-Triplex-forming oligonucleotides reveal increased cyto- and genotoxic effectiveness compared to Phosphorus-32. *Int J Radiat Biol.* **2016** Nov; 92(11):679-685.

Dahmen V, Kriehuber R. Cytotoxic effects and specific gene expression alterations induced by I-125 labeled triplex-forming oligonucleotides. *Int J Radiat Biol.* **2012** Dec; 88(12):972-9.

Radiation Biology / Cell & Molecular Biology / Physics / Chemistry:

The candidate / research fellow should have a strong background in fluorescence confocal laser scanning microscopy and is experienced, ideally, with Fluorescence Resonance Energy Transfer (FRET) technique, substantiated by relevant peer-reviewed publications and should also have a strong general interest in radiation biology.

The candidate should be familiar with mammalian cell culture techniques and basics in molecular biology. Expertise with the Zeiss Laser Scan Microscope Axio Observer Z1 LSM 700 would be beneficial.

Excellent written and spoken English skills are mandatory.

Please tick:

- Life Sciences
- Natural Sciences
- Engineering Sciences
- Social Sciences and Humanities

6. Deadline² for considering interests by postdoctoral applicants:

30. September 2018

² Please consider that the preparation of a Marie Skłodowska-Curie proposal requires some time. Fellow and supervisor have to agree on a project and training opportunities for the fellow.