



DC9: Optimisation of a protocol and creation of a commercial kit for the quantification of mitochondrial DNA oxidative lesions

Host institution: [University of Udine](#), Department of Medicine, Udine, Italy

Supervisor: [Dr. Carlo Vascotto](#)

Co-Supervisors: Prof. Lena Burbulla, Ludwig-Maximilians University of Munich (Academic); Dr. Thomas Frischmuth, baseclick GmbH (Industrial); Roma Galloway, Nanoverly Ltd. (Industrial).

Project description: This PhD project focuses on the development and optimisation of a robust protocol to quantify oxidative lesions in mitochondrial DNA (mtDNA), with the long-term goal of translating the method into a standardized commercial kit. Oxidative damage to mtDNA is a hallmark of various pathological conditions, particularly in neurodegenerative diseases, where mitochondrial dysfunction is a key driver of cellular decline. However, sensitive and reproducible methods for detecting and quantifying these lesions remain limited.

The project will build upon existing molecular biology techniques, integrating qPCR-based assays, DNA damage quantification methods, and lesion-specific polymerase arrest assays to detect and measure oxidative modifications in mtDNA. The first phase will involve protocol refinement and validation in standard biological models, followed by adaptation for use in more complex systems, including neuronal cell models relevant to neurodegeneration. A critical objective is to produce comprehensive technical guidelines for applying the protocol across different species and experimental contexts. The final phase will focus on adapting the method for high-throughput and commercial use, including scalability, reproducibility, and user-friendliness of the proposed kit.

By combining academic research with applied development, this project aims to deliver both scientific insights into mitochondrial genome stability and practical tools for the biomedical research community.

Host laboratory: Research activities in the group of Dr. Vascotto are focused on the study of DNA repair mechanisms, mitochondrial RNA processes, and the role of mitochondria in tumour progression and resistance. The laboratory has full access to laboratories for handling mammalian cell cultures and primary human cells under normal and hypoxic conditions; flow cytometry facility; microscopy facility equipped with state of the art microscopes for confocal and nanoscope analyses, and *in vivo* fluorescence microscopy; instruments for monitoring cell parameters (e.g. viability, apoptosis, mitochondrial respiration, and more).

Secondments: This project is carried out in strong collaboration with the following groups, and visits to their laboratories are expected during the project. A willingness to travel and spend time abroad is therefore essential:

- [Prof. Lena Burbulla](#), [Ludwig Maximilian University](#), Germany;
- [Dr. Thomas Frischmuth](#), [baseclick GmbH](#), Germany.

Eligibility conditions:

- Master's degree in Biology, Biotechnology or related field.
- Applicants must be doctoral candidates, i.e. not already in possession of a doctoral degree.
- Mobility rule: researchers must not have resided or carried out their main activity in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their recruitment date.

Required skills:

- Research experience (e.g. through Master thesis work or research internships) in cellular and molecular biology techniques are required. Experience in mitochondrial biology and/or nucleic acids analysis will be a strong advantage.
- Proficiency in the English language is required, as well as good communication skills, both oral and written. Successful candidates will need to provide an English test (e.g. IELTS, TOEFL, Cambridge English). You may be exempt if you are a national of a majority native-English speaking country, or have qualifications / degree that has been taught and assessed in English. The supervisor can also confirm that a candidate has the required level of English.

Enquiries

For general information about the INT2ACT Doctoral Network visit the project website (www.int2act.eu) or send an email to int2act@gmail.com.

For additional information on this project please contact Dr. Carlo Vascotto (carlo.vascotto@uniud.it).

How to apply

To learn more about the application process, visit the INT2ACT recruitment web page (<https://int2act.eu/open-positions/>).

Required documents:

1. Statement of interest (limit of 2,500 characters) explaining why you wish to be considered for the fellowship and which qualities and experience you will bring to the role.
2. Curriculum vitae et studiorum.
3. A certificate of University examinations taken (with marks).
4. A final degree certificate translated in English. If, at the time of application, candidates should not be yet in possession of a degree certificate, they can submit it at the time of the examination.

All documents must be merged into a single PDF file, in the order listed above.

A limited number of applicants will be invited for an interview and will be required to provide contact information of up to two contact person for reference letters.

Application deadline

The closing date for applications is **January 31 2026**.