## DC14: Development of p53 expressing lipid nanoparticles to target tumour microenvironment (TME) for breast cancer treatment

**Host institution:** Technion Research and Development Foundation, Haifa, Israel

**Supervisor:** Prof. Avi Schroeder

**Co-Supervisors:** Dr. Dafne Campigli, Istituto Italiano di Tecnologia (Academic); Dr. Jeny Shklover, Technion – Israel Institute of Tehnology (Academic); Roy Nevo, Mana Bio Ltd. (Industrial).

**Project description:** This project focuses on the development of lipid nanoparticles (LNPs) carrying messenger RNA (mRNA)-based therapeutics for targeted delivery to the tumour microenvironment (TME) in breast cancer. The central aim is to design and optimize LNPs for efficient mRNA encapsulation, stability, and controlled release, while incorporating targeting strategies to ensure selective uptake by triple-negative breast cancer (TNBC) microenvironment cells. Particular emphasis will be placed on engineering lipid composition and surface modifications that promote efficient delivery to cancer-associated fibroblasts, immune cells, and dendritic cells, thereby enabling localized protein expression and functional modulation of the TME. The formulations will be systematically characterized for encapsulation efficiency, stability, and uptake in relevant cell models, followed by in vivo evaluation in TNBC mouse models to determine biodistribution, preferential accumulation in TME cells, and therapeutic benefit.

Overall, the project seeks to translate chemical design principles in lipid nanoparticle formulation into effective modulation of the tumour microenvironment, paving the way for next-generation mRNA nanomedicines in cancer therapy.

**Host laboratory:** The Louis Family Laboratory for Targeted Drug Delivery and Personalized Medicine Technologies, led by Prof. Avi Schroeder, aims to improve patients' quality of life and treatment by developing innovative medical technologies. Specifically, we focus on targeted drug delivery systems to treat cancer and brain neurodegenerative diseases. Our nanotechnology is designed according to the loaded drug (proteins, gene delivery, and small molecules) and to the targeted organ. We are a multinational and multidisciplinary team, offering an inspiring research environment that brings together diverse expertise to drive innovation in medical science.

**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:

- Dr. Francesco Nicassio, Istituto Italiano di Tecnologia, Italy;
- Roy Nevo, Mana Bio Ltd., Israel.

**Eligibility conditions:**

- Master's degree in Organic chemistry, Chemical Engineering, Biotechnology, Biochemistry, or related fields.
- 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.

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**Required Skills:**

- Research experience (e.g., through a Master's thesis or research internships) in organic chemistry and biochemical techniques is required. Experience in chemical synthesis and/or nanoparticle formulation will be considered 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 during the interview that a candidate has the required level of English.

**Enquiries**

For general information about the INT2ACT Doctoral Network visit the visit the project website (www.int2act.eu) or send an email to int2act@gmail.com.
For additional information on this project please contact Prof. Avi Schroeder (avids@technion.ac.il) or Dr. Jeny Shklover (jenysh@technion.ac.il).

**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.**