

# SIMICA

THERAPEUTIC SITE-SELECTIVE  
PROTEIN-MODIFICATION CHEMISTRIES



## Newsletter XI

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Apr 2023

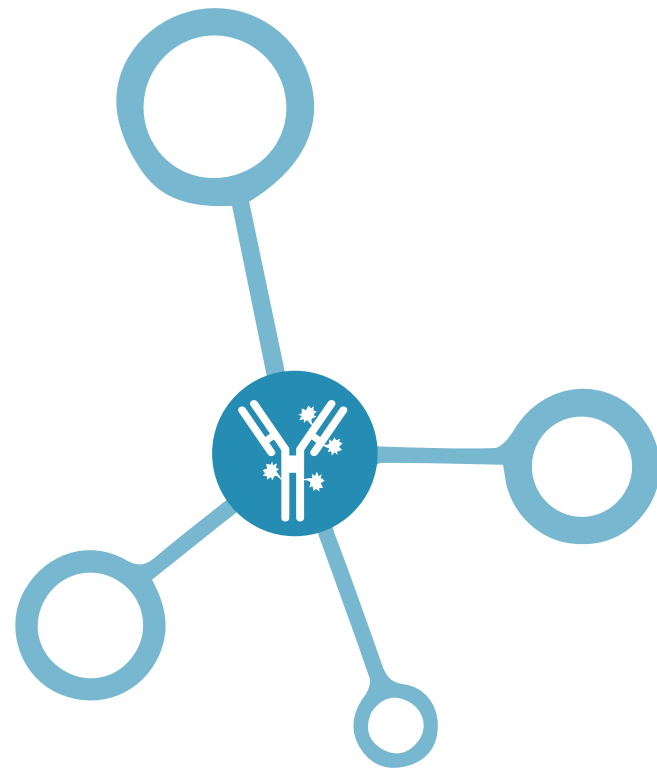


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THERAPEUTIC SITE-SELECTIVE  
PROTEIN-MODIFICATION CHEMISTRIES

## OVERVIEW OF THE PROJECT

The SIMICA Project intends to place the Instituto de Medicina Molecular João Lobo Antunes within the core of a European network of laboratories that seeks to produce cutting-edge research in the field of site-selective protein modification.



### Did you know that:

Personalised medicine, also referred to as precision medicine, is the process of tailoring medical decisions and interventions to an individual person.

### Zebrafish patient avatars in precision cancer therapy:

The capacity to distinguish tumors that will benefit from anti-cancer treatments from those that will not remains a challenge.

Patient-derived xenografts (PDXs), also called “avatars,” are generated by the implantation of human primary tumor cells or tissues into a host animal. Many PDX models have been developed to be used as a platform for drug screening in cancer research and precision medicine, mainly using mouse models. However, mouse models require a long time for tumor growth, which is not compatible with first clinical decisions.

In this context, the zebrafish PDX model (zPDX or zAvatar) has been recognized as a promising in vivo model to directly challenge patient cells with anti-cancer therapies in a personalized manner. The assay relies on the injection of tumor cells from patients into zebrafish embryos to then test and identify the best available drug combination for a particular patient.

## Meet the SIMICA Collaborators

Rita Fior group leader at Champalimaud, is a Developmental Biologist, fascinated by how cells interact with each other for example to compete or synchronize their actions. Throughout her career Rita Fior was always interested in the cellular interactions that lead to differentiation and stem cell maintenance. By the end of her Post-Doc under the supervision of Leonor Saúde (iMM, PT) and Julian Lewis (FRS, CRUK), she became interested in cancer. This career change came with the awareness that there are several chemotherapy options, but no available test to determine the best therapy for each individual patient. With this goal, Fior optimized and challenged a zebrafish larvae xenograft model to test if it could reveal differential response to therapy. Her work was recognized with several prizes and honorable mentions such as Genetics of The Year (Genetics Society), BioMED Central Research award, Criostaminal and BIAL Clinical Medicine. Rita has also extensive experience in teaching in several Master and PhD programs and was author and co-editor of a textbook in Molecular and Cell Biology of Cancer, Springer (Fior and Zilhão, 2019).

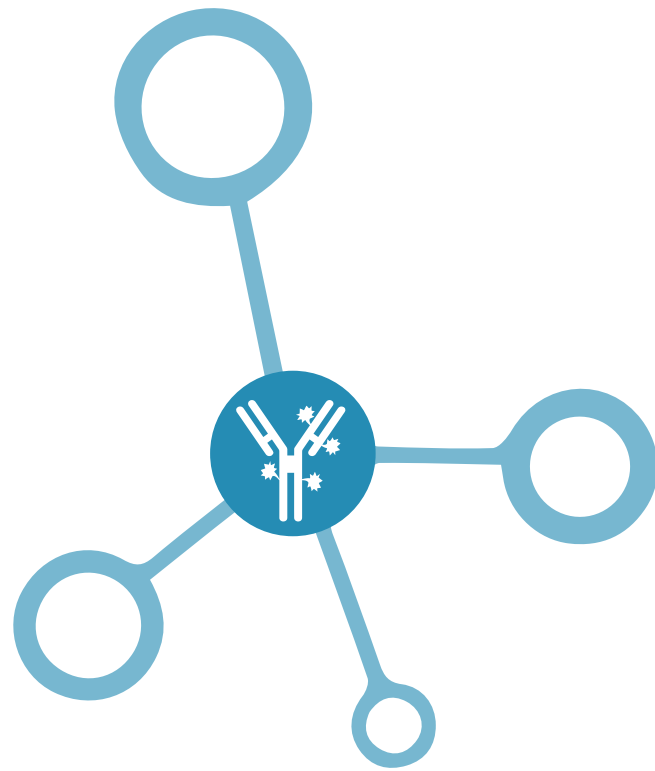


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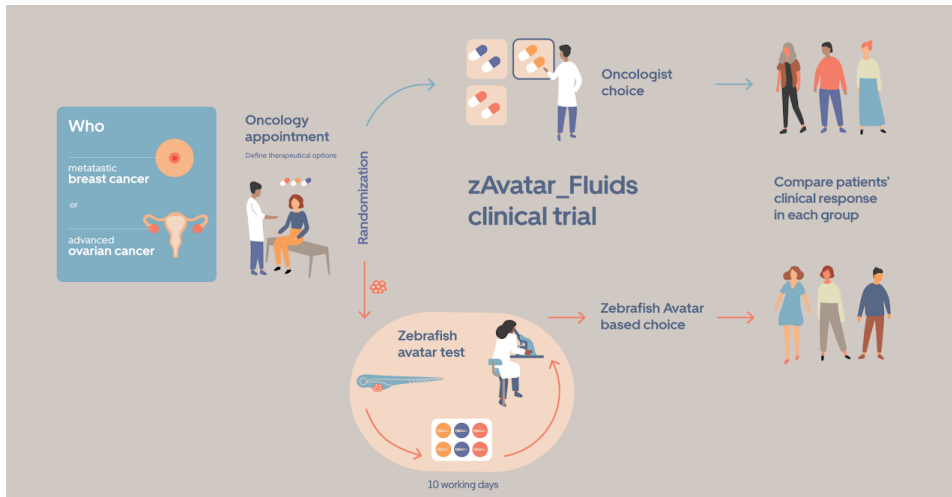
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Compared to mouse PDXs, zAvatar assays take less time and do not require in vitro or in vivo cell expansion. This method is being used in a clinical trial at Champalimaud to predict the therapeutic response of drugs against advanced ovarian cancer and metastatic breast cancer. SIMICA and Rita Fior established a close collaboration to use the zebrafish PDX models for evaluation of the therapies being developed at IMM (ACS Pharmacol. Transl. Sci. 2022, 5, 11, 1156–1168).



## SIMICA news

- Emma Yates (co-founder & CSO of Proteotype) gave a talk for IMM about developing a novel technique for early stage cancer diagnosis using amino-acid signatures in blood.
- Ana Guerreiro presented his work about "Therapeutic Vaccines for Cancer" at Basi hosted by Catarina Cardoso.

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