

RECRUITING AND TRAINING PHYSICIANS-SCIENTISTS TO EMPOWER TRANSLATIONAL RESEARCH
A MULTILEVEL TRANSDISCIPLINARY APPROACH FOCUSED ON METHODOLOGY, ETHICS AND INTEGRITY IN
BIOMEDICAL RESEARCH - 2018-2023



FMUP FACULDADE DE MEDICINA
UNIVERSIDADE DO PORTO



FONDAZIONE
MONDINO
Istituto Neurologico Nazionale
& Cluster Scientifico IIRCCS

RESEARCH TRAINING PROGRAM

I. General Information

Title of the research project:

Does breast cancer influence insulin production or modulation?

Name and address of the department:

Biomedicine department – University of Porto, Faculty of Medicine
Alameda Prof. Hernâni Monteiro, 4200-319 Porto

Student's supervisor:

Carla Luís

II. Description of the project

The link between type 2 Diabetes mellitus (T2DM) and breast cancer (BrCa) has been widely explored as both pathologies shared many biologic mechanisms like inflammation, oxidative stress and insulin pathways. Observational studies reported increased cancer mortality in patients with obesity and T2DM which may be attributed to hyperinsulinemia, elevated IGF-1 or both [1].

Our group has recently recognized that carbohydrate metabolism is inverted on BrCa cell line MCF-7 exposed to an obesity-mimetic environment [2]. Thus, we hypothesized that the insulin pathway may also be altered.

With this work, we intend to clarify how cancer may influence the insulin signaling and whether cancer promotes progression of T2DM. To address this, we will expose pancreatic insulin producing cell lines to conditioned medium previously exposed to BrCa cell lines on obesity-mimetic environment and assess insulin concentration, insulin receptors expression, and associated binding proteins.

References:

- [1] E. J. Gallagher and D. LeRoith, "Minireview: IGF, insulin, and cancer," *Endocrinology*, vol. 152, no. 7, pp. 2546–2551, 2011.
- [2] C. Luis *et al.*, "Warburg Effect Inversion: Adiposity shifts central primary metabolism in MCF-7 breast cancer cells," *Life Sci.*, 2019.

Type of research project:

Basic science Clinical research without lab work Clinical research with lab work

III. Student's involvement

The student will mainly observe	<input type="checkbox"/> YES	<input type="checkbox"/> NO
The student will observe the experiments but will be involved in data analysis	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
The student will take active part in experiments ("lab work")	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
The student will take active part in clinical examination (clinical research)	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
The student will be allowed to work with patients	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO

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What are the tasks expected to be accomplished by the student?

This project will be divided in 2 main steps:

1st Step – Observation (approximately 1 month)

The student will observe the supervisor and learn how to work with cell lines within the rules of the department's cell culture laboratory.

2nd Step – Experiment (approximately 2 months)

The student will be involved in data analysis and perform the assays associated with the program described previously.

What is expected from/what will be the general outcome of the student?

To prepare a poster / presentation / scientific report / abstract

The student's name will be mentioned in a future publication

(The student will be coauthor if the results are published)

Opportunity to present together with the supervisor the results on a conference

No specific outcome is expected

IV. Requirements

What skills are required from the student?

The student must have:

- Interest in basic research;
- Solid knowledge on laboratory behavior;

Preference is given to those with:

- Knowledge in molecular biology techniques;
- Cell culture basics.

Is there any special knowledge or a certain level of studies needed?

Subjects passed:

Previous experience with:

Certificate of:

None

Are there any legal limitations in the student's involvement in the project? YES NO

If yes, what are the limitations?

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For the use of students considering participating in the project, further information can be found from the following references:

(please add specific references, max 3)

- [1] E. J. Gallagher and D. LeRoith, "Minireview: IGF, insulin, and cancer," *Endocrinology*, vol. 152, no. 7, pp. 2546–2551, 2011.
- [2] C. Luis *et al.*, "Warburg Effect Inversion: Adiposity shifts central primary metabolism in MCF-7 breast cancer cells," *Life Sci.*, 2019; 223:38-46.

V. Schedule

Duration of the project:

1 month 2 months 3 months

There are approximately 3 hours of work per day. (minimum)

Available months:

January February March April May June
 July August September October November December

How many students can you accept to the project at the same time? 1

Special remarks:

(e.g., students should bring a stethoscope and a white coat, any vaccinations required, etc.)

Students should bring a white coat, a personal computer and basic office material.

NOTE: a scientific report is required at the end of the program