Master thesis plan: Validation of a non-invasive method using embryonic culture medium NMR metabolic profile for pre-implantation genetic diagnosis and implantation potential prediction.

Supervisors: Luís G. Gonçalves (ITQB Nova), Ana V. Coelho (ITQB NOVA) and Sofia Nunes (IVI Lisboa)
Institutions involved: ITQB Nova and IVI Lisboa

Short summary

According to the World Health Organization, infertility is a disease that affects 17.5% of the population at reproductive age. An important factor is the advanced maternal age of women seeking to conceive, since with advancing age it is more common for chromosomal alterations to appear in the embryos. These alterations are often not compatible with life, blocking embryonic development, making embryonic implantation impossible and/or causing miscarriages.

In this way, pre-implantation genetic tests and, therefore, the study of embryo aneuploidy, are increasingly frequent in the routine of infertility treatment, for women of advanced reproductive age. However, existing methods for testing and early diagnosis of embryonic aneuploidies have some limitations and problems: they are invasive, time-consuming, expensive and require highly specialized technicians, with several stages of embryonic handling until the diagnosis is obtained. Currently, there have been several approaches to develop non-invasive methods for detecting specific biomarkers in the embryonic culture medium for aneuploidies. Our team conducted previous preliminary study, where it was analysed by ^{1}H-NMR the metabolic profile of the embryonic culture medium using ^{1}H-NMR for early detection of embryonic ploidy. The results were promising, but it is necessary extent the study to a larger cohort. The aim of this work-plan is validated the previous study and to build a predictive model based on the information about the metabolic alterations observed in the between euploid and aneuploid embryos. It is also intended to verify the correlation between their culture medium the implantation potential of the embryos.

Study steps:

Obtaining the samples to be studied – the collection of samples at IVI Lisboa is completed, consisting of a cohort of 30 samples of embryonic culture medium.

A) Sample preparation and acquisition of ^{1}H-NMR spectra in ITQB

B) Statistical analysis of data at ITQB

C) Collection of pregnancy and live birth data in the IVI LISBOA database

D) Construction and validation of a predictive model

Note: The project has been approved by the Ethics Committee of IVI LISBOA under code 2004-LIS-037-SN, requiring an addendum for the inclusion of task D.

Calendarização | ***Timeline***

	Mês | *Month*											
Tarefa | *Task*	**Set**	**Out**	**Nov**	**Dez**	**Jan**	**Fev**	**Mar**	**Abr**	**Mai**	**Jun**	**Jul**	**Ago**
Tarefa B)												
Tarefa C)												
Tarefa D)												
Tarefa E)												

Jul/Ago – Escrita da Tese | Thesis writing

Duration (in weeks): 45
Lab name: Proteomics of non-model organisms Lab

Contact for more information (name and email): Luís G Gonçalves (lgafeira@itqb.unl.pt)