

# Study develops software that can reduce costs and speed up the process of assisted reproduction

Gabriel Jordani / 24 de agosto de 2023 / In English



## Fertility | By identifying the best eggs of the patients, software developed by research makes it possible to know in advance the quality of the embryo that will be formed after in vitro fertilization

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\*Photo: Cidacs/Fiocruz-Bahia

Infertility is an impairment faced by many people who want to start a family today. According to data from the World Health Organization (WHO), about 190 million people around the world experience infertility, which affects approximately 50 million couples. In Brazil, it is estimated that it affects 8 million individuals.

Considering these numbers, a doctoral dissertation from the Graduate Program in Biological Sciences with an emphasis in Biochemistry at the Federal University of Rio Grande do Sul created methods to support fertility clinics in choosing the best eggs of their patients for in vitro fertilization. The research has published five articles in international indexed journals, the software Ostera Test and an operational startup, Ostera. Ostera Test seeks to increase the success rates of the assisted reproduction process, which today is around 30%.

Infertility is the inability to get pregnant after one year of failed attempts, which impacts 15% of reproductive-age couples, reaching up to 30% in underdeveloped countries.

In the study, the author Lucia Meirelles has identified distinct components of cellular processes, metabolism, and antioxidant defenses of the Cumulus cells, which have the function of coordinating the follicular development and protection of the oocyte, which originates the egg. Since this material is rich in biological information regarding the condition of the oocyte, it is possible to anticipate methods and technologies applicable to the clinical practice in order to help patients under assisted reproductive technology.

After collecting 223 samples of human Cumulus cells, the researcher worked in different scenarios in vitro (in the laboratory) and in vivo (in living organisms) to identify determinant points for oocyte development. Another goal was to find prognostic markers of quality, that is, characteristics that allow the best cells to be identified.

The model that can predict oocyte quality works by analyzing gene expression levels of 25 selected target genes. After being evaluated by the software, this data helps to form a “ranking” of the best oocytes for each patient.

Through the results of the patient’s oocytes, the tests proved the project’s capacity to anticipate the quality of the embryo that will be formed after in vitro fertilization. The researcher has reached an average accuracy of 84% to indicate the ability of the embryos to develop to the next stage of the embryonic process. Thus, the tool helps in choosing the best embryo to be transferred to the uterus.

### Clinical changes with the use of Ostera

Lucia explains that, in assisted fertility clinics, patients undergo stimulation for egg production so that, based on this, doctors can analyze the gametes. “We cannot transfer too many embryos from the mother’s uterus because there is a high risk of a twin pregnancy (more than one fetus),” says the researcher. “We used to lack a tool which was not only visual to assist the embryologist in identifying the embryo’s potential. And what the Ostera Test does is exactly that,” she adds.

Another goal of the startup is to prevent patients from keeping their eggs frozen for years without being sure of the potential of their possible future embryos. In this way, one could know, from the beginning of the process, how prone a cell is to become a future pregnancy.

Lucia claims that her work can open doors for new studies in this segment, such as further elucidation of the biological processes of the ovarian follicle and female fertility.

“Human assisted reproduction is a relatively recent field of study. The first person who was born through such a technique is now about forty years old. Because it is a new area, we also have a lot of room for further research.”

— Lucia Meirelles

Today an assisted fertilization cycle costs about 20 thousand *reais* and it takes on average four cycles to achieve pregnancy. The cost of the Ostera process, on the other hand, is 4 thousand reais per cycle. “This is exactly what we want to help with: shortening the time and effort, with fewer cycles,” the researcher points out. “An average couple will spend 100,000 *reais* to have a child, which is completely unattainable for the majority of the population,” she adds. With the reduction in cycles made possible by Ostera, the waiting list for assisted reproduction treatments in the Brazilian National Health System – which is between 3 to 5 years – should also be reduced.

For the researcher, lack of information about patients’ infertility and reproductive potential is one of the factors that do impact the reproductive health of the population. “Most women at 35, 40 years of age are starting to think about having children, but for the biology of the reproductive system this is very bad, because it is already regressing,” she says. “Information needs to be a powerful tool,” she adds.

Translated into English by **Bruna Rodrigues Justino**, undergraduate student enrolled in the course “Supervised Translation Training II (English)” of the Undergraduate Program in Language and Literature, under the supervision and translation revision of Professor Elizamari R. Becker (P.h.D.).

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