InSilicoTrials

# Accelerating drug development for women's health using the InSilicoTrials' platform for design and evaluation of clinical studies

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Finding therapies and drugs that provide the best treatment for and support the health of women can be a unique challenge. Of course, some conditions affect women exclusively, but also, women are not always included in the design of clinical trials and testing of new drugs. Since men and women differ in physiology and pharmacology, this can mean treatments are not optimal for women.

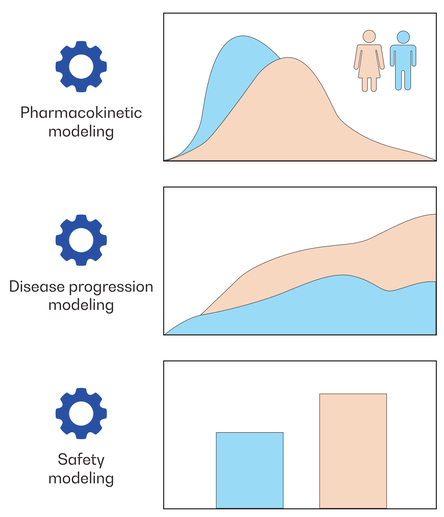
**THE INSILICOTRIALS PLATFORM ACCELERATES DRUG DEVELOPMENT** Supported by a global scientific network, the InSilicoTrials' platform hosts healthcare simulation tools to be applied throughout drug development[1] to quantitatively assess the impact of gender on drug exposure, drug effects and disease status. The platform, user-friendly and cloud-based, allows testing of alternative study designs and visualization of simulation results. Integration with real-world databases facilitates generation of synthetic placebo groups in indications where there are recruitment challenges.

**THE PLATFORM SUPPORTS INCLUSION AND OPTIMAL TREATMENT OF WOMEN** Using the platform for clinical trial simulation helps assess the impact of including more or fewer women in the study population and drug therapy on pregnancy and lactation. The platform also includes models for detailed description of the interplay of hormones in the female reproductive system and for women-specific diseases, e.g., polycystic ovary syndrome, and breast and ovary cancer.


## GENDER DIFFERENCES IN DRUG EFFICACY AND SAFETY

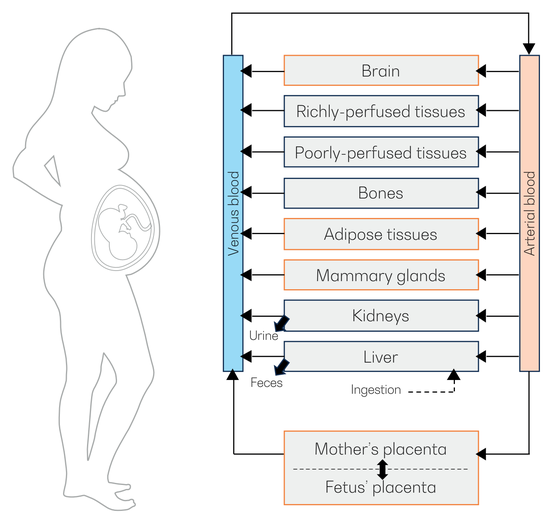
By incorporating gender as a covariate or parameter into pharmacokinetic and disease progression models, the differences in drug exposure, disease status, treatment effects and safety outcomes between men and women can be predicted. These gender-specific models can be leveraged for:

- Evaluation of impact of gender in clinical trial design
- Evaluation of safety and efficacy of drugs across genders
- Evaluation of dosing in a gender-specific manner

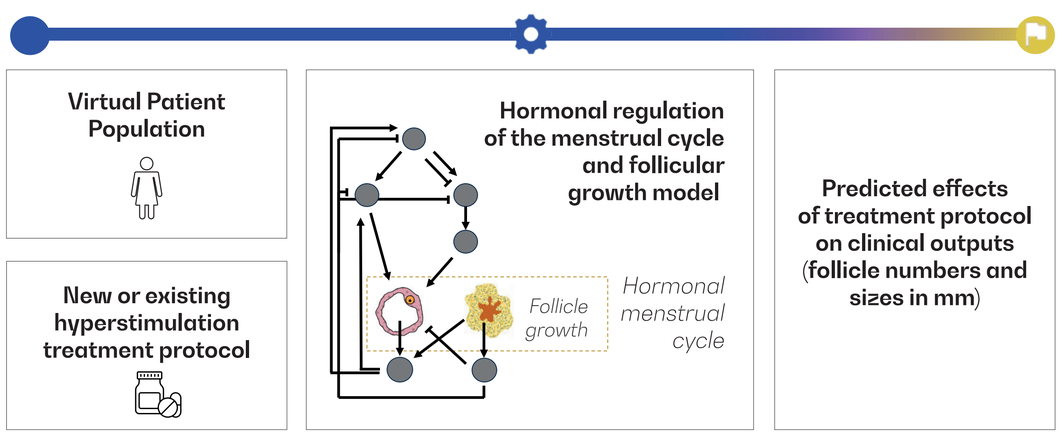



## DRUG SAFETY AND EFFICACY IN PREGNANCY

Physiologically based pharmacokinetic (PBPK) modeling allows to integrate pregnancy-related anatomical and physiological changes into a mechanistic model. Pregnancy PBPK models can be used to optimize clinical trial design and inform dose adjustment in pregnant women, particularly in cases where clinical data are limited. Furthermore, PBPK modeling can be used to predict fetal drug concentration as well as estimate mother and infant drug exposure during lactation[2].



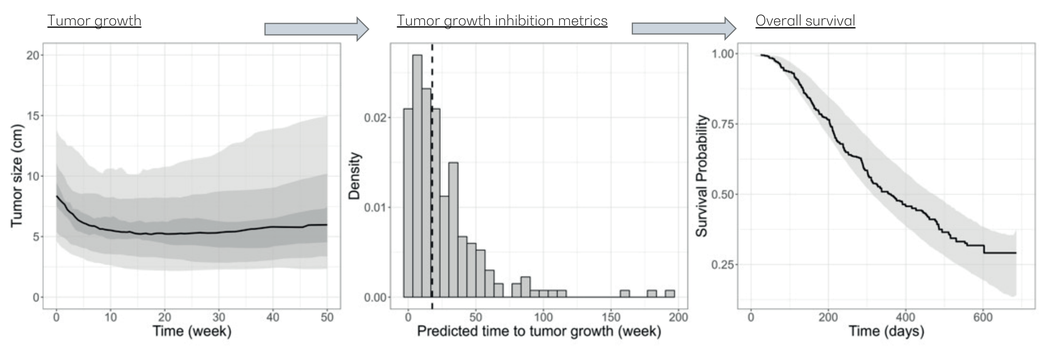

## OPTIMIZING FEMALE FERTILITY TREATMENT




Due to the large heterogeneity in the hormonal regulation of the female menstrual cycle and the variability of the response of growing follicles, developing effective and personalizable fertility treatment regimens with new and existing drugs is a major challenge.
For this reason, we have developed the InSilicoENDO suite – a suite of modeling solutions consisting of mechanistic models of female hormonal cycles and follicle growth[3] that can support the testing of new and existing therapies.
The in silico tools can be leveraged to support internal decision making, clinical trial design, and analysis of (pre-) clinical data. In this way, the suite can accelerate drug development and support the availability of optimally effective treatment protocols to patients.

## PREDICTING SURVIVAL IN OVARY AND BREAST CANCER

Tumor growth models are typically built using imaging data to track tumor size. They can be used to describe the increase in size of solid tumors, such as breast and ovary cancers, and assess the extent of tumor growth inhibition under different chemotherapeutic regimens and targeted therapies. Furthermore, these models can be used to derive metrics of tumor growth dynamics which can be linked to overall survival, thus allowing to predict the potential outcome of a phase III study.

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