

TECHNOLOGY OFFER

Placental Perfusion – *Ex vivo* Model for Physiological Analyses of Materno–Fetal Transfer of Substances

- Model system to study and to monitor transfer of substances to the fetal circuit in late pregnancy
- Imitation of in vivo conditions in late pregnancy over several hours
- Dual system with completely separated maternal and fetal circuits
- Physiological conditions: constant organ temperature, control of vascular pressure and oxygen concentrations
- No testing on laboratory animals, exclusively human placentas from normal or pathophysiological pregnancies are applied

BACKGROUND

In pregnancy, transfer of substances between mother and fetus across the placenta follows complex processes. In general, due to ethical reasons testing and approval of pharmaceuticals is only conducted in non-pregnant women. Application of drugs in pregnancy needs different risk management based on results from drug-induced developmental toxicology tests. Any form of pre-clinical evidence concerning putative transport mechanisms of pharmaceuticals across the placenta is an important decision-making support for regulatory authorization.

Dual perfusion of a single placental lobule is the only experimental model to study transfer of substances in organized tissue. In comparison to other experimental methods, results from perfusion experiments may reliably predict exposure of substances to the unborn.

TECHNOLOGY

Separate circuits for maternal and fetal compartments are setup by implementation of specific cannulas to the placenta. This physiological setting allows observation of substance exchange between the maternal and the fetal circuit. A blood gas analyzer simultaneously analyzes perfusion media in both circuits; a software parses all incoming data.

ADVANTAGES

- Resembles most closely in vivo situation
- Measure transfer of substances over longer period of time and simultaneous sampling
- Potential for avoiding animal experiments for toxicity testing
- Testing on human organ leads to higher relevance of results
- Standardized experimental conditions
- Reprocessing of perfused tissue
- Primary placental cells as complementary approach available
- Easy access to placenta material due to upright approval of ethics committee
- Analysis software allows GLP-compliant documentation

FIELDS OF APPLICATION:

Pharmaceuticals relevant in pregnancy (e.g. vaccines, biologicals, drugs), nanoparticles, environmental pollutants and other substances, which may transfer to the fetal circuit or may affect placental function.

RESEARCHERS:

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COOPERATION OPTIONS:

Offering
Contract research
Investigator initiated studies
Third party funded research projects
Possible Partners
Pharmaceutical industry
Regulatory authorities
Research organizations

DEVELOPMENT STATUS:

Established and internationally recognized approach

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