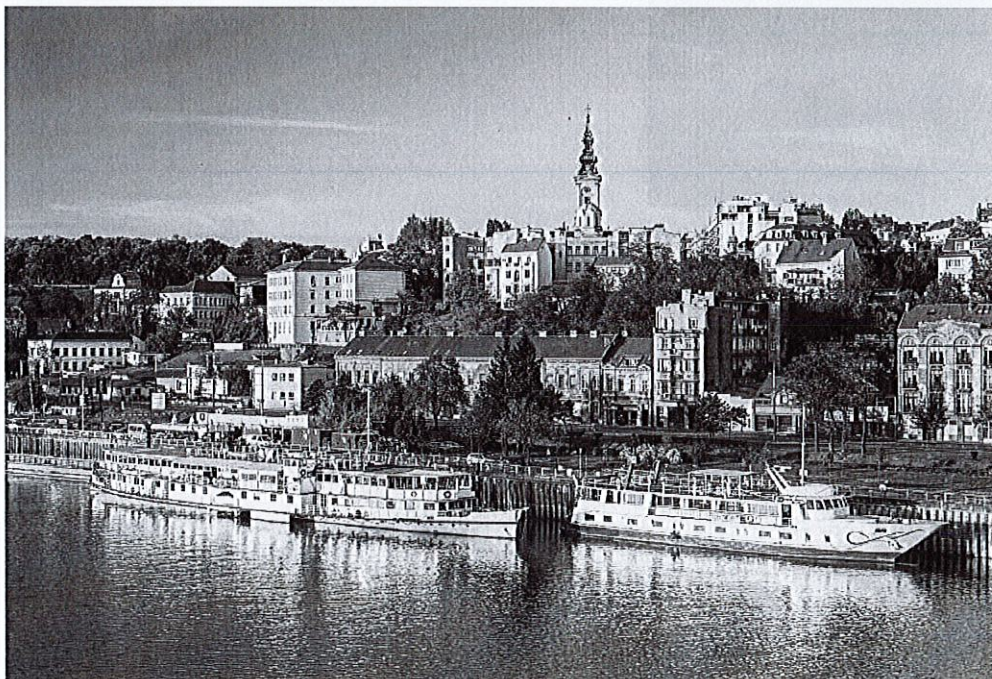




“Cells Communicate!”

Book of Abstracts of the Second CellFit Workshop 2019



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Bovine preimplantation embryos at the single cell level: An accurate model for human reproductive approaches?

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Abstract. The Lanner laboratory has presented a comprehensive single cell transcriptional road-map of early human embryo development and are now initiating functional gene studies using CRISPR genome editing in the early embryo. Considering the shortage of surplus human embryos donated for research, it is feasible to obtain cow ovaries from healthy animals that entered the food chain. Physiological and phylogenetic similarities, as well as readily efficient protocols available from oocyte maturation, fertilization and embryo production in vitro, encourage the use of these animal models in reproductive approaches. In human, cells undergo an intermediate state of co-expression of lineage-specific genes, followed by a concurrent establishment of the trophectoderm (TE), epiblast EPI), and primitive endoderm(PE) lineages, which coincide with blastocyst formation. Another elusive facet of early

human development is X chromosome dosage compensation. Similar insights into the early bovine development are severely limited.

We have performed Single-cell expression analyses in individual blastomeres collected from preimplantation bovine embryos at different developmental stages from morula to expanded blastocyst. We have found top differentially expressed genes elucidating how lineage specification and pluripotency is controlled in the early bovine embryo, as well as how X chromosome dosage compensation occurs in this specie. We are complementing complement our findings with genome editing in bovine embryos by generating knock out (KO) embryos of different target genes to study their effects the in the early preimplantation embryo. We aim to translate the gained knowledge from our bovine experiments to the human embryo. We also expect to offer theoretical support for efficient derivation and culture of bovine embryonic stem cells (bESCs) in their respective human primed and naïve stem cell states.