

Mouse Placental Development (lecture and practical): Monday 2nd July 10.00

Although mouse and human placentas are somewhat architecturally different, the overall structure and the molecular mechanisms required for placental development of both species are quite similar. As a result, the mouse is increasingly used as a model for studying the development and function of the placenta. This lecture will cover key concepts in mouse placental development, including the major developmental milestones that are necessary to form the structure of the mature placenta (e.g., trophoblast lineage differentiation into the three main placental layers, branchpoint initiation and morphogenesis for villi formation, trophoblast invasion, etc). Using key examples in the literature, emphasis will be placed on common experimental techniques, such as the generation and phenotypic characterization of knockout and conditional knockout mutants, analysis of transgenic reporter lines and tetraploid aggregation studies, which further facilitate our understanding of the molecular mechanisms behind trophoblast differentiation and cell function. In the practical following the lecture, participants will be given hands-on experience in the careful dissection of midgestation mutant mouse conceptuses to grossly identify placental defects using a systematic phenotyping checklist. Methods for the proper structural and molecular characterization of mouse placental phenotypes will be outlined. Identifying how and why placental development can go awry will ultimately help us understand the cellular and molecular processes required for normal development and, therefore, a healthy pregnancy.

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