RNA mediated non-Mendelian epigenetic heredity: Paramutation, first observed in maize and now in mice, is a heritable epigenetic change, an exception to the law of Mendel first demonstrated by the transmission of a fur color variation. It was extended to the transmission of pathological states. Heredity is mediated by the zygotic transfer of RNAs and microRNAs. New models are thus proposed for the non-mendelian familial transmission of diseases.

Organogenesis and development of the kidney: Kidney disease represents a growing health problem in Western societies. In Europe alone more than 4.5 Million suffer from renal disorders. While most kidney diseases are acquired, there is a significant proportion that develops as a result of developmental defects. We are developing the necessary mouse models for understanding the development and function of the kidney, of outstanding importance, for the future. Understanding the differentiation of the renal components will ultimately help developing new approaches in therapy.

Sex determination: In mammals, sex determination involves the differentiation of an initially bipotential gonad into either testis or ovary. We have shown that the transcription factor Sox9 is a key gene of differentiation of the testis. Recently, mutations of Rspo1, a ligand of the beta-catenin signalling pathway, have been shown to indicate a role in female differentiation. Current studies analyze the role of the gene in these important lineages and also in squamous cell carcinoma, a very aggressive skin cancer.
Partnerships and collaborations

Equipe 1:
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Equipe 2:
Prof. André Brändli, ETH Zürich, Switzerland, Identification of genes involved in early kidney induction
EuReGene consortium (18 members): Establishment of a 3D kidney atlas
Publi
Prof. Etienne Berard/ Jean-Francois Michiels. CHU Nice. Molecular basis of kidney diseases and cancer.
Prof. Seppo Vainio, Biocenter Oulu, Finland. Developing methods for renal tissue engineering

Equipe 3:
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Prof Giovanna Camerino. ITALIE (Europe). Université de Pavia.
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Key publications