Derivation, culture and genetic modification of mouse embryonic stem cells (mESC) at PHENOMIN-ICS.

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Résumé

Introduction
Organoid-based experiments are invaluable for studying organ development and disease modeling. These experiments rely on high-quality starting materials, such as mouse embryonic stem cells (mESCs). Our team specializes in deriving mESC lines from any genetic background, including wild-type, transgenic, and mutant mice. Additionally, we offer custom generation of genetically engineered alleles, including fully humanized alleles, tailored to meet specific research needs.
Aims
We aim to provide researchers with custom mESC lines derived from live or frozen embryos, sperm, or mice, while also creating 'à la carte' genetically engineered mESCs using CRISPR-assisted or traditional approaches.

Methods
Our standardized protocol enables the derivation of mESCs from diverse sources and genetic backgrounds. For cases where no mouse line harboring the desired mutation exists, we modify our proprietary wild-type mESCs to introduce custom alleles. Our team employs advanced genetic engineering tools, including CRISPR and traditional mESC techniques, to generate precise modifications, such as large-scale humanizations.
Quality control measures ensure the integrity of the derived lines, including Southern blotting, long-range PCR, ddPCR for chromosomal anomalies, Giemsa karyotyping, and genotyping.

Results
We have achieved consistent success in all mESC derivation attempts. CRISPR technology has enabled the generation of alleles previously considered challenging or unfeasible, such as complex genetic modifications and large-scale humanizations. Our proprietary mESC lines exhibit a high transmission rate of over 80% per injected clone, supporting efficient in vitro differentiation and downstream applications.
Conclusions
Our expertise in deriving high-quality mESC lines and engineering complex genetic modifications positions us as a valuable resource for researchers in organoid-based experiments and genetic studies. We are committed to providing tailored solutions to advance your research. For inquiries, contact us at mutagenesis@igbmc.fr.

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Mots-Clés: mESC, mouse embryonic stem cells, in vitro model