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Cancer and gut microbiota interaction pipeline in mouse models

What service do we offer?

Cancer and gut microbiota interaction pipeline in mouse models

Genetically modified mice that serve as models of inherited diseases or as tools to dissect biological mechanisms have proven essential to the progress of biomedical science. Mice, like humans, are heavily colonized by micro-organisms that can be pathogenic, innocuous, or beneficial commensals. In humans and mice, the microflora roughly represents 90% of the cells that compose an individual. The phenotype associated with a specific mouse genome modification may result from disruption of the interactions between the host and its microflora. Commonly, mice are raised in the now standard Specific Pathogen Free (SPF) conditions, which do not significantly modify the extreme diversity and number of colonizing micro-organisms. Gnotobiology techniques allow for the generation and maintenance of animals in a germ-free or axenic environment and the possibility to restore specific components of the microflora. The comparative analysis of a given mouse line raised in SPF and in germ-free condition, reveals the contribution of the microflora to the phenotype associated with a specific mouse genotype. This approach has been essential e.g., to discriminate between autoimmunity and inflammatory immunopathologies in various mouse models. Germ-free animals can also help us to understand the host-commensal interactions during tissue regeneration, like in the intestinal epithelium. Metabolic disorders are now also clearly associated with the microbiota composition. The notion that the microbiota could also influence behaviour is being investigated as well. Finally, the importance of microbes in cancer and cancer therapy has been increasingly claimed in the past few years. To test new experimental settings on this expanding research area, the use of germ-free/gnotobiotic technology constitutes an attractive tool.

APPLY NOW!!



Included in the service:

This is included in the service provision by default.



- New axenization of strains provided by the user as live animals (minimum of 10 females and 5 males) or quality controlled frozen embryos or sperm (minimum of 40 embryos or 2 straws of sperm).

Disclaimer: Certain mouse lines may not breed under SPF and axenic conditions, and derivation attempts will then be discontinued. Usually, two attempts will be made to derive germ-free mice.

- Provision of germ-free animals from the unit production to the user. 3 strains are available, both in Germ-free and SPF status (for controls): C57BL/6J, C3H/HeN, C57BL/6.Rag2KO.
- Access to organs, tissues and biofluids from germ-free mice (from new axenizations and from strains available in the unit production).
- Conduction of gnotobiology experiments. Validated techniques: body weight and body temperature measurement, buccal swab, IP and IV injections, gavage, blood collection, faeces collection, surgeries (vasectomy, and renal ischemia-reperfusion), OGTT (Glucose tolerance), ITT (Insulin tolerance), and solid tumour size measurement and follow-up.

Additional support:

This can be provided on demand if there is canSERV funding available, or on a fee-for-service or collaborative basis and will require further negotiations with the applicant.

- Extended breeding services under germ-free conditions.
- Logistics support and advice to ship rederived germ-free mice to their facilities can be provided. Dedicated shippers will be provided for transportation and specialised courier services will be recommended.
- The Axenic/Gnotobiology platform can host clients to perform on site experiments, e.g., histology, flow-cytometry, microscopy.



Who provides this service?

The Axenic/Gnotobiology Facility of the Instituto Gulbenkian de Ciência



The Axenic/Gnotobiology Facility of the [Instituto Gulbenkian de Ciência \(IGC\)](https://www.igc.gulbenkian.pt/) is among the very few dedicated facilities in Europe that have the required equipment and expertise to generate germ-free and gnotobiotic mice and routinely offers their services to external users. The participating axenic and gnotobiology platform support research into host-microbiota interactions to study the role of the microbiome in health and disease. This has been studied extensively and established the involvement of the microbiome in metabolism, nutrition, physiology, and immune function and showed that mammalian microbiota plays a crucial role in the pathogenesis of many diseases such as cancer.

The facility is adapted for breeding and experimentation purposes. For axenic colony management and maintenance of stock animals, rigid isolators, transfer chambers and containers are used and equipped with the Double Door Rapid Transfer Port (DPTE®), a user-friendly and safe connecting system for introducing and removing equipment and other materials to and from sterile isolators. To run experimental conditions in germ-free/gnotobiotic mice, the Airtight Sealed Positive Pressure Individually-Ventilated Cages technology is used. In this system, each cage is assembled with an individual HEPA-filter for air in flow ensuring a full sterile environment.

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Axenic/Gnotobiology Platform at IGC



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[INFRAFRONTIER, the European Research Infrastructure for Modelling Human Diseases](#), is a non-profit organisation dedicated to advancing disease understanding and treatment through cutting-edge models. Operated by a [network of over 20 leading biomedical research institutes](#), it empowers research on human health and disease. Committed to excellence, INFRAFRONTIER adheres to rigorous scientific benchmarks and prioritises animal welfare. Through [collaboration with other infrastructures](#), it fosters global data sharing and contributes to tackling significant health challenges. INFRAFRONTIER serves as a platform for innovative technologies and knowledge exchange, leveraging the power of disease modelling to improve human health.

INFRAFRONTIER offers a host of cutting-edge in vivo services in [canSERV](#) like generation of precision cancer models, in-depth cancer phenotyping and more! These free-of-charge services are offered by INFRAFRONTIER partners that are world-class experts in disease modelling.