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EMMAservice: European Mouse Mutant Archive service

Improving our understanding of multiple sclerosis, breast cancer and many other diseases that are entirely or partly inherited depends to a large extent on mutant mice that have been deliberately bred with genetic defects. European medical researchers have created hundreds of these ‘mouse models’, but lack of money and space means that not many of them are preserved once their original purpose has been fulfilled. The EU-funded EMMAservice project, the continuation of EMMAinf, is helping to save valuable mutant mouse strains collected by EMMA, the European Mutant Mouse Archive.

● THE MOUSE AS A MODEL OF HUMAN DISEASE

The mouse shows great similarities in development, physiology and biochemistry to humans. This makes it a key model for research into human disease. The identification of all the genes in mice and humans in the Human Genome Project has shown that about 99% of the genes in mice have a homologue in humans. This is important as to date around 5 000 human diseases have been shown to be caused by an error in our genetic make-up. In numerous other diseases - e.g. in diabetes - errors in our genetic make-up are a contributing factor. The similarity of the mouse and human genome means that genes associated with disease in humans can be investigated in mouse models. This knowledge can then be transferred to understanding and treatment of disease in humans.

The key challenges for mouse functional genomics in the 21st century are to:

- develop a series of mutant alleles for every gene in the mouse genome
- develop and apply standardised phenotyping platforms to determine the phenotypic consequences of each mutation
- identify mouse models for the complete disease spectrum in humans.

To exploit this emerging resource, mouse models must be preserved and made available to the entire European biomedical research community, which is wholly dependent on new mouse models of human disease. Therefore, it is imperative that a secure, well managed central repository exists for the cryopreservation and dissemination of mouse lines which will ensure pan-European access and efficient delivery of mouse models, prerequisites for maintaining Europe’s leading role in the functional annotation of the mouse genome.

EMMA, the European Mouse Mutant Archive, is the primary mouse repository in Europe for the deposition and distribution of mouse disease models and research tools. The EMMA network is a non-profit making organisation and is currently comprised of ten partners. The European Bioinformatics Institute is responsible for the development of the EMMA resource database. All other partners are major players in mammalian genetics research with a long standing expertise in mouse genetics, mutagenesis, phenotyping and cryopreservation.



● FURTHER DEVELOPING EMMA

Building on EMMA's previous achievements and its ability to respond to the needs of the European biomedical research community, EMMAservice aims to meet the future challenges presented by archiving and disseminating mouse disease models in the European Research Area. This includes the cryopreservation of 1224 new mouse mutant lines. The majority of this 'free of charge' service will support strain donations from individual researcher, but EuroMouse programmes will also benefit. EMMA also includes a germ-free service which supports the generation of germ-free mouse models and also maintain lines of general interest as live stocks in germ-free conditions.

To underpin the EMMA cryopreservation service EMMAservice is developing new and refining existing EMMA

sperm freezing technologies. Moreover, training courses in these technologies will be continued and complemented with a new course format that aims to promote the shipment of frozen mouse resources.

EMMA informatics activities will support the networking and service activities by computational and manual data curation efforts. This will ensure the highest possible quality of the strain related data for EMMA users and will facilitate the data's integration with other mouse resources by extensive cross referencing. And to ensure the highest number of people possible are aware and take advantage of EMMA, outreach efforts are being expanded and specifically address the human genetics and translational research communities.



Project acronym: EMMAservice

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EU project officer: Brigitte Sambain

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Partners:

Medical Research Council (UK)
Centre Européen de Recherche en Biologie et Médecine (FR)
Genome Research LTD (UK)
Helmholtz Zentrum München Deutsches Forschungszentrum für Gesundheit und Umwelt GMBH (DE)
Europäisches Laboratorium Für Molekularbiologie (DE)
Karolinska Institutet (SE)
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Project webpage: www.emmanet.org