EUPRIM-NET: European Primate Network: Specialised infrastructures and procedures for biological and biomedical research

Scientists say monkeys' DNA is so close to humans' genetic make-up that they are classed in the wrong order of species. Indeed, the monkey is so close to man that non-human primates are suitable models for biological and biomedical research. They are essential for the successful development of new strategies against human diseases, whether infectious viruses like AIDS-HIV, hepatitis and malaria, or neurological disorders such as Alzheimer's or Parkinson's, for cancer research, finding new vaccines and gene therapy, and organ transplants. They may be essential for man, but the high ethical demands of research on primates and the complexity of the research mean they must be handled with care. That is where the European primate centres come in. Eight specialised centres in Germany, the Netherlands, Sweden, France, Italy and the UK are working together in an EU-funded Integrated Infra-structure Initiative aimed at advancing knowledge and competence in the areas of primate-based research, animal keeping and breeding. EUPRIM-NET, a 4-year project that kicked off in April 2006, seeks to provide top-quality service to support the best science meeting the highest ethical and welfare standards.

From Darwin's theory to the evolution of biomedicine

The project brings together the unique facilities of the EU's main publicly-funded primate centres which combine research and breeding to form a virtual European Primate Centre. The goal is to provide the basis for internationally competitive state-of-the-art research by provid-ing European scientists with access to excellent infrastructure and services. Thanks to their wide range of biological and biomedical R&D activities, the centres already have extensive knowledge and infrastructure resources, as well as solid experience in primate housing and breeding, to pool into an integrated and efficient network to help improve basic and applied biological and biomedical research with primates.

For instance, the German Primate Center and the Swedish Institute for Infectious Disease Control have considerable experience in HIV vaccine studies in macaques. One of the UK partners uses primates for research on immunology and cross-species comparisons, while the National Institute for Biological Standards and Control prepares, stores and distributes WHO international standards and reference material. At the Dutch Biomedical Primate Research Centre, primates are used for virology, parasitology, immunobiology, comparative genetics, alternatives and animal science. In France, the CNRS's Station de Primatology relies on them for research into reproduction, malaria, and social ethology, while the Italian Institute of Neurobiology and Molecular Medicine (INMM) concentrates on the molecular mechanisms of cell functions, with particular reference to the nervous system, experimental immunology, cell proliferation and death as well as human disease, prevention and treatment.

Monkey business

As a team effort, EUPRIM-NET focuses mainly on animal welfare and ethics; standardisation of procedures and methods for the use of non-human primates in biomedical research; enhanced availability of non-human primates and training for researchers and caretakers

working with primates. The project coordinator, the German Primate Center in Göttingen acts as a centre of excellence for research with primates and as a service and competence centre for both domestic and foreign laboratories and zoos that house primates. So the primates' well-being is its prime business and the 3Rs of replacing, reducing and refining tests on ani-mals a key principle.

All of EUPRIM-NET's activities contribute to the 3R-concept. **Refinement** and improvements in animal welfare are achieved by standardising methods and techniques used in primate research across Europe and by disseminating the corresponding knowledge through workshops, etc. The development of telemetric monitoring devices will not only re-duce stress for the animals but provide tools for entirely new experimental capabilities. Addi-tional improvements in welfare are expected through two of EUPRIM-NET's Joint Research Activities focusing on the viral and microbacterial state and the genetic profile of the primates bred and housed at the European primate centres as well as those imported into the EU. Improving the corresponding characterisation of individual animals is critical particularly for infection studies whose success depends on the availability of healthy animals with a defined genetic status.

The principle of **Reduction** is met by reducing the number of animals needed for a given scientific project through an improved characterisation and selection of animals used in a particular experiment. The number of primates that are needed to provide biological samples for research is brought down by optimising collection and distribution of samples through banks of biological materials. Unique non-human primate models of human diseases are offered which can be used by the research community in order to advance the development and testing of new therapies and diagnos-tics for chronic immune-based disorders.

Replacement is supported by banks of biological materials of primate origin that often help avoid the use of additional primates for providing materials. These banks can also contribute to the development of cell culture techniques replacing the use of live animals.

One of the Transnational Access activities involves setting up a central database on the pro-ject website giving an overview of availability and providing access to material banks from primates and distribution of materials to external users. The collection comprises tissue (snap-frozen, embedded and fixed), DNA, RNA, cDNA, serum, and cell lines from healthy as well as diseased animals. Users can apply for samples on-line or by e-mail.

Training and experience in using primates for research is given a high profile in EUPRIM-NET's Networking Activities, involving advanced and specialised courses for scientists and other staff and spreading knowledge about positive reinforcement training of non-human primates, which has been gathered in the primate centres over the years, so that it can be performed by the animal technicians as part of their daily routine in the animal rooms.

EUPRIM-NET will also be keeping tabs on those monkeys. Another Joint Research Activity is designing two telemetric devices that al-low recording over distances of 3 to 10 metres in freely-moving lab monkeys as well as trans-mission of control commands to coupled effectors. The first system is a head-mounted device suitable for recording electric neuronal activity from the brain or peripheral nervous system and the second an intra-corporal device to record metabolic parameters.

European Primate Network: Specialised infrastructures and procedures for biological and biomedical research in summary

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Partners: DPZ - German Primate Center (DE), BPRC - Biomedical Primate Research Centre (NL), NIBSC - National Institute for Biological Standard and Control (UK), DSTL - Defence Science and Technology Laboratory (UK), SMI - Swedish Institute for Infectious Disease Control (SE), INMM - Istituto di Neurobiologia e Medicina Molecolare, Consiglio Nazionale delle Ricerche (IT), CdP - Centre de Primatologie, University Louis Pasteur (FR), SdP - Station de Primatologie, Centre National de la Recherche Scientifique (FR)