

Integrated Project: EVI-GENORET (LSHG-CT-2005-521036)

In a society which relies heavily on information flowing through visual media, the growing number of people who suffer from visual impairment is a worrying trend. The retina, the part of the eye which converts light into sight, is a highly complex biological system whose development and function are influenced by a large number of genes, many of which remain unknown. Yet, if researchers are to find effective ways of treating the causes of blindness, they need to understand the genetic and cellular interactions that produce and maintain that system.

At the moment, they are hampered by the lack of an integrated database of retinal information in Europe. "If you're interested in a particular disease or drug, you have to search the resources of each different research centre," explains José-Alain Sahel, director of the Laboratory of the Molecular and Cellular Pathobiology of the Retina at the French medical research agency INSERM and Paris VI University, and a co-founder member of the Brussels-based European Vision Institute. Moreover, he says, existing databases have not been constructed according to widely accepted standards, and fundamental procedures vary from centre to centre – for example, the method for examining the retina called retinography.

Sharing the platform

Sahel is coordinating a new initiative on the functional genomics of the retina in health and disease, EVI-GENORET, a four-year Integrated Project awarded €10 million by the EC to establish common working platforms and to share tools and knowledge. One of its objectives is to build an integrated database pooling every kind of information relevant to the biology of retinal cells, from clinical data including family histories, to information on genotyping, proteomics, therapy design and much more. "At the moment, we're working hard on technical aspects, and developing Standard Operating Procedures which will be used by all EVI-GENORET participants," says project manager Olivier Lorentz, the scientific project manager of EVI-Genoret who works in Paris for Inserm-Transfert SA..

The database will eventually be used to create an identity card for each gene containing all the available information on its function in the retina. The emphasis is on ease of use so, for example, members of the consortium led by E Zrenner, Tuebingen, are currently developing a mind map that will reflect how a doctor would logically wish to input clinical information. Part of the database is expected to be available to scientists and doctors by the end of 2005, and although it is still very much a work in progress, it is already promising to transform the way research is done in this field. "The database was originally conceived of as a tool, but it has become a philosophy i.e. a new approach to system biology," says Sahel.

Looking ahead

Meanwhile, basic research on the retina continues, and the number of genes that have been identified as playing a part in inherited retinal degenerations is increasing. Several European groups collaborated on the discovery in 2004 of a gene which, when mutated, gives rise to a severe disease called retinitis pigmentosa, in which the main retina's photoreceptor cells gradually die off. This protein is likely to become a potent therapeutic

tool. Armed with the EVI-GENORET database, researchers will be better equipped to translate such findings into an improved classification of disease in both clinical and molecular terms, to identify novel therapeutic targets and to devise more effective drug-delivery systems that selectively target defective photoreceptors, for example.

<http://www.evi-genoret.org/>