



# Press Release – Science

Leuven, Belgium – 8 May 2006

## ***Scientists develop ENDEAVOUR – a computer program for identifying disease genes***

**Leuven, Belgium – Genes are the underlying cause of a large number of disorders. But identifying and studying these genes more closely is a major challenge for biotechnologists worldwide. Researchers from ESAT-SCD (Engineering Sciences) and the Flanders Interuniversity Institute for Biotechnology (VIB) connected to the Catholic University of Leuven have now developed ENDEAVOUR: a computer program that compiles and processes data from a variety of databases and identifies the genes that play a key role in the origin of a disorder. ENDEAVOUR will undoubtedly become an indispensable tool for identifying disease genes. In testing their program, the researchers have succeeded in identifying a gene that plays a major role in the development of 'DiGeorge syndrome'.**

### **Seeing the forest for the trees...**

Genes play an important role in a large number of disorders – prime examples are Alzheimer's disease and cancer. A good understanding of these genes is essential in the quest for diagnoses and treatments. But identifying these 'key genes' among thousands of genes is an enormous challenge. Years of effort by scientists all over the world have led to a vast amount of data, but analyzing it is complex. These days, scientists are not only concerned with generating new data but also with deciphering the existing data, and thus being able to see the forest for the trees.

### **ENDEAVOUR**

To decipher these genetic data, scientists have developed the computer program ENDEAVOUR. Drawing on various databases, ENDEAVOUR gathers all the data about genes that are known to be connected with a disease or a biological process and integrates these data into a mathematical model. With the aid of this model, scientists study the similarities between the 'known genes' and genes whose biological function is not yet known. ENDEAVOUR then indicates whether these genes might possibly underlie a certain disorder.

### **Testing the method**

ENDEAVOUR has been fine-tuned and tested in the laboratory. The researchers took the data for a number of known genes from the mathematical model and then entered the genes as 'unknown' into ENDEAVOUR. For the majority of the syndromes tested (such as Alzheimer's disease, leukemia, colon cancer, and Parkinson's disease), ENDEAVOUR found the underlying genes and thus proved its validity.

### **Zebra fish enter the fray**

As an extra validation of the program, the researchers used ENDEAVOUR to look for new disease genes that underlie hereditary disorders. Among other things, they wanted to identify a new gene that can be correlated with DiGeorge syndrome – a genetic disorder that affects more than 1 in 4000 newborn children. The infants have deformed features and blood vessel abnormalities in the heart. ENDEAVOUR identified one gene as a possible disease gene: YPEL1.

To confirm this mathematical prediction biologically, the researchers used the zebra fish as model system to replicate the disease. They studied zebra fish that could not produce the zebra fish YPEL1 gene. The embryos of these fish showed several abnormalities that are comparable to the symptoms of DiGeorge syndrome. This study provided the ultimate proof that ENDEAVOUR is a very useful tool for identifying new disease genes.



### **Identifying genes quickly**

ENDEAVOUR can accelerate research into a number of disorders by providing the tools for rapidly identifying genes that play a role in the disorders.

### **Combining forces**

Collaboration among several different research groups is not always easy to achieve, but it does usually lead to significant added value. The publication resulting from this research clearly demonstrates the importance of constructive collaboration in arriving at innovative results. Indeed, this is not the result of a single group's research, but of the collaboration of four different research groups. The development and validation of a program such as ENDEAVOUR is possible only through the combination of a variety of skills and expertise.

This collaboration combined the forces of ESAT (Catholic University of Leuven) and three VIB research groups in Leuven: the Neurogenetics group and the group for Applied Human Genomics in the Department of Human Genetics, and the Functional Genomics of Cardiovascular and Neurovascular Biology and Disease group in the Department of Transgene Technology and Gene Therapy.

ENDEAVOUR can be used via: [www.esat.kuleuven.ac.be/endeavour](http://www.esat.kuleuven.ac.be/endeavour) or [www.bits.vib.be/endeavour](http://www.bits.vib.be/endeavour).

Given that this research can raise a lot of questions for patients, we ask you to please refer questions in your report or article to the email address that VIB makes available for this purpose: [patienteninfo@vib.be](mailto:patienteninfo@vib.be). Everyone can submit questions concerning this and other medically-oriented research directly to VIB via this address.

### **Relevant scientific publication**

This research appears in the authoritative journal *Nature Biotechnology* (Gene prioritization through genomic data fusion; Aerts *et al.*, *Nature Biotechnology*, 2006).

### **Funding**

This research has been funded by VIB, IWT, FWO, the Catholic University of Leuven, and the European Union.

### **Note to the Editor:**

VIB, the Flanders Interuniversity Institute for Biotechnology, is a research institute where 850 scientists conduct gene technological research in a number of life-science domains, such as human health care and plant systems biology. Through a joint venture with four Flemish universities (Ghent University, the Catholic University of Leuven, the University of Antwerp, and the Free University of Brussels) and a solid funding program for strategic basic research, VIB unites the forces of nine university science departments in a single institute. Through its technology transfer activities, VIB strives to convert the research results into products for the benefit of consumers and patients. VIB also distributes scientifically substantiated information about all aspects of biotechnology to a broad public.

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