



SIXTH FRAMEWORK  
PROGRAMME

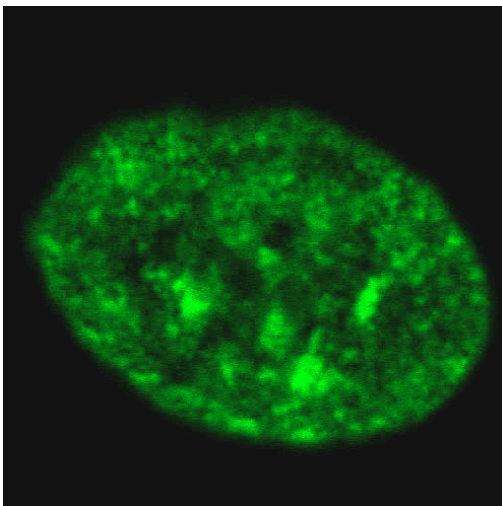


UNIVERSITEIT VAN AMSTERDAM

## PRESS RELEASE May, 2004

### A new way of looking at the human genome

**Under the EU Sixth Framework Programme (FP6) for Research and Development (2002-2006) 2.2 million Euros have been awarded to the 3DGENOME-research program. FP6 is one of the world's largest research programmes, with a budget of 17.5 billion Euros, of which around 3 billion Euros is available for life sciences research. The main objective of the 3DGENOME program is to understand how the human genome, consisting of a number of very long DNA molecules that carry our genetic information, are coiled up inside our cells. By changing the way that DNA is folded, cells control the switching on and off genes, which are the units of genetic information. Results will help to understand errors in our genetic system that for instance result in tumour formation. The research program is conducted by a consortium of seven European partners and is coordinated by the Swammerdam Institute for Life Sciences of the University of Amsterdam in The Netherlands.**



Spatial distribution of DNA in the nucleus of a human cell. Here all DNA has the same colour (green). In the 3DGENOME program different stretches of DNA will get a different colours.  
*micrograph courtesy Dr. P.J. Verschure*

The human cell orchestrates the activity of its about 35,000 genes in an extremely efficient and reliably way. These genes are bits of information on DNA. Each of our cells contains DNA molecules with a total length of 2 meters, folded inside a cell nucleus of only 1/100<sup>th</sup> of a millimetre diameter. This is comparable to packing 20 km of thin wire inside just a tennis ball. Evidently, the DNA thread is extremely folded inside a cell. This folding plays an important role in how a cell switches genes on and off, thereby deciding how the cell behaves. Folding decides whether a cell becomes a skin cell, a liver cell or a neuron, and whether a cell is healthy or sick.

The 3DGENOME program should lead to a breakthrough in our understanding of how our genome functions. Using advanced

microscopic techniques in combination with novel data analysis software, the consortium of European scientists intend to establish a three-dimensional map of the DNA fibre inside the human cell. This spatial structure will be related to patterns of switched off and stitched on genes along the DNA molecule.

Since it is very likely that the three-dimensional organisation of genomes is the same for all animals, the 3DGENOME program, in addition to human cells, incorporates studies on cells from the mouse and from fruit flies, two well-studied organisms. Each of these organisms has specific technical advantages, such as (i) detailed information about how genes are arranged on the DNA and which genes are switched on and off, (ii) technology to visualise DNA inside the cell using state-of-the-art microscopy, and (iii) methods to analyse microscopy images and to obtain information about the three-dimensional folding of DNA.

### **The 3DGENOME consortium**

Eight research groups and one company join forces in the 3DGENOME consortium. Each group contributes specific expertise that is required for this program.

- 1 University of Amsterdam, prof. dr. R. van Driel (co-ordinator), The Netherlands
- 2 Ludwig Maximilian Universität München, prof. dr. T. Cremer, Germany
- 3 Ruprecht-Karls-Universität-Heidelberg, prof. dr. C. Cremer, Germany
- 4 Deutsches Krebsforschungszentrum, prof. dr. R. Eils, Germany
- 5 Centre National de la Recherche Scientifique Montpellier, dr. G. Cavalli, France
- 6 Academic Medical Center/University of Amsterdam, prof. dr. R. Versteeg, The Netherlands
- 7 Academy of Sciences of the Czech Republic, dr. S. Kozubek, Czech Republic
- 8 Scientific Volume Imaging BV, dr. H. van der Voort, The Netherlands

### ***Further information***

*For more information you can contact prof. dr. Roel van Driel (University of Amsterdam), co-ordinator of the 3DGENOME program.  
phone: +31-20-525 5150, e-mail: [van.driel@science.uva.nl](mailto:van.driel@science.uva.nl)*