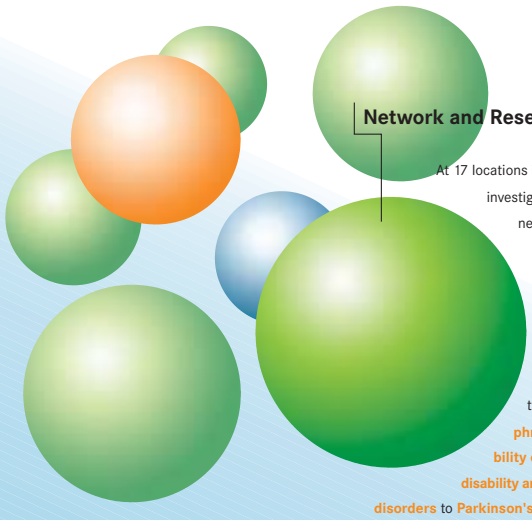
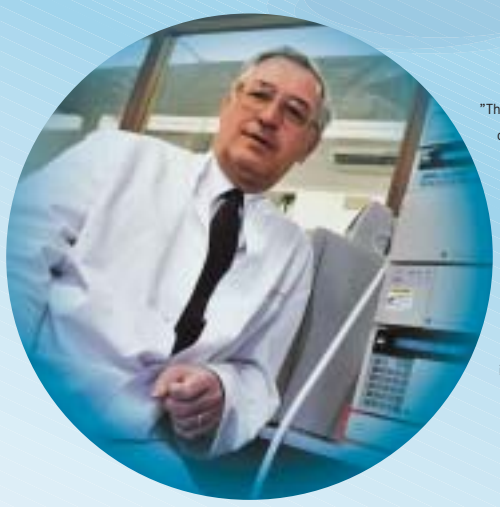
Genome Network

Diseases of the Nervous System



Network and Research

At 17 locations in Germany scientists are investigating the genetic basis of neurological diseases. The brain is by far the most **complicated organ** of the human organism. It steers all processes in our body from simple movements to complicated intellectual accomplishments. The **spectrum** of the individual areas of disease is therefore broad: ranging from **schizophrenia, epilepsy, stroke, overexcitability of the nervous system, mental disability and alcoholism, weight regulation disorders** to **Parkinson's** and **Alzheimer's**.



"The investigation of genetically complex diseases requires the **cooperation** of **clinical researchers**, **molecular geneticists**, and **genetic epidemiologists**. Only through continual cooperation and feedback can we merge the various information. T**he NGFN has created special opportunities for collaboration.** Though there was some collaboration previously, it was not practiced to the extent it is practiced now in the NGFN."

Prof. Dr. Peter Propping, Bonn

"We need medicine to combat Alzheimer's, so that members of our society can **age with dignity**. And so that we no longer have any fear of inescapable and chronic progressive diseases. Genome research can help us **treat diseases quite differently in the future**."

Karin B., shop assistant

Example Alzheimer's Disease

Amyloid plaques in the brain, a deposit of protein, lead to Alzheimer's disease. In industrial countries five percent of the population over 65 years and even every fifth person over 80 years are affected by this particular form of elderly dementia. In Germany there are currently about **800,000 Alzheimer patients**. Due to increasing life expectancy, this figure will rise drastically in the next years. Characteristic for the disease is its chronic progressive course, which begins with memory dysfunction and leads to the complete loss of all self-care ability in the final stage.

The amyloid plaques are only verifiable after the death of the patient, so that Alzheimer therapy is at present implemented after other treatable dementia diseases have been excluded. A cure is not possible, even though new drugs can momentarily delay the progression of the disease. Researchers worldwide are trying to find a way to **diagnose** the disease more **quickly** and above all are trying to find out how it can be **treated and ultimately cured**

Goal of Genome Research on Alzheimer's Disease

Researchers want to find targets for drugs with which Alzheimer's disease can be treated at its cause. One **starting point** has crystallized within the framework of genome research. If the **enzymes could be blocked** that are responsible for the deposit of protein plaques, the entire process of the pathogenesis of the disease could be prevented

Research Results That Inspire Hope

The enzymes to be blocked are the ones that cut amyloid, a "sticky" protein, out of a large precursor protein and deposit it in the form of clumped plaques. These **scissors-like enzymes**, which are important for the formation of plaques, are called secretases. They are active even in young people and produce the "poisonous" amyloid that begins to pile up in old age. However, if the scissors are blocked, the production of amyloid will be diminished and the onset of the disease will be prevented. First research results have facilitated insight into one of the two forms of secretase. In the **animal model** it was possible to switch off the genes for the subunits of the enzyme, causing the secretase to fall apart. The result: a complete inactivation of this process. Thus, the first starting points for **drugs to treat Alz-heimer's disease** have been achieved

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