

## Healthcare industry BW

### Neurodegenerative diseases

**It is estimated that around 1.2 million people in Germany suffer from dementia, and around 200,000 people are diagnosed with neurodegenerative diseases every year. It is expected that by 2050, one in three people in Germany will be over 60 and the number of age-related diseases, particularly dementias, for which no effective curative therapy is currently available, will increase considerably. Given the large numbers of elderly people and age-related diseases, many pharmaceutical companies are working hard to develop new drugs for the therapy of neurodegenerative diseases.**



Prof. Dr. Konrad Beyreuther  
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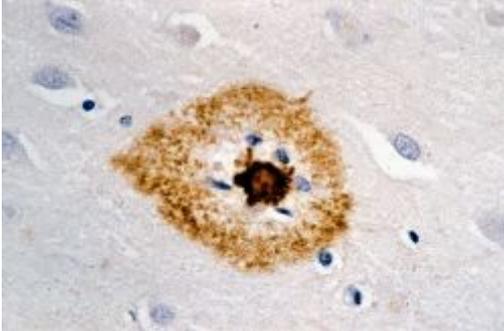
Germany's population is getting older and older. And this is associated with different risks. The older a person gets, the higher the probability of developing dementia. Neurodegenerative diseases are associated with the degradation of specific nerve cell populations in the central nervous system, which occurs mainly in elderly people. Although not all neurodegenerative diseases are age-related, they nevertheless have one thing in common: there is currently no curative treatment available.

35 million people worldwide currently suffer from dementia. Neurodegenerative diseases can have a broad range of symptoms, including mental, cognitive and motor disorders. It is expected that in Germany by 2050, the mean life expectancy for men will be 81 and for women 87. The number of people in Germany who live to be over 80 will triple, and one third of all Germans will be over 60. It is expected that this increase in the elderly population will also lead to an increase in people suffering from neurodegenerative diseases, which is predicted to affect around 115 million people worldwide.

The most frequent neurodegenerative diseases are dementias such as Alzheimer's disease. Other frequent neurodegenerative diseases are characterised by motor disorders, for example Parkinson's

which is characterised by the death of nerve cells in the midbrain, which leads to amyostasia and paralysis.

## Alzheimer's disease



The protein amyloid beta aggregates to insoluble depositions in the brain of Alzheimer's patients. The toxic aggregations (stained brown) lead to the destruction of nerve cells and prevent the brain from functioning properly. (Photo: University Hospital T

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Alzheimer's disease is the best known and most frequent neurodegenerative disease, affecting around one million people in Germany. Around 20 per cent of people over 80 is affected. The relatives of Alzheimer's patients are often those who suffer the most due to the patient being unable to remember things, suffering short-term memory loss, and often becoming tired and bedridden. The patients' personality changes, they can become depressive, aggressive, apathetic and disoriented.

The BMBF-funded German Dementia Competence Network is seeking to improve the treatment of neurodegenerative diseases by coordinating research into medication that is used to delay the progression of the disease. The network also hopes that the results will be able to provide assistance to both patients and relatives.

No medication is yet available for the curative treatment of Alzheimer's. In addition, the causes of the disease are not yet fully understood. Genetic predisposition to the disease and amyloid depositions in the brain of Alzheimer's patients have been identified as causes of the disease. As the disease progresses, the degradation of nerve cells leads to acetylcholine deficiency in the brain. Acetylcholine deficiency reduces brain function. Neurotransmitters are released by the nerve cells and degraded once the signal has been transferred. The progression of neurodegenerative diseases such as Alzheimer's can be delayed using drugs known as antidementia drugs, the majority of which are acetylcholine esterase inhibitors that prevent the degradation of acetylcholine.

In addition, researchers around the world are focusing on the development of vaccines to counteract the development of neurodegenerative diseases and drugs containing cholesterol and inflammation inhibitors, which for the moment are completely new drugs that are associated with too many adverse reactions.

## Research and development

In view of the increasing number of people expected to develop neurodegenerative diseases, researchers around the world are looking for new therapies and diagnostic tools. Research into the causes of neurodegenerative diseases such as that being carried out by the Hertie Institute for Clinical Brain Research serves as the basis for new therapies.

Correct diagnoses are required for medications to exert their curative effect. Therefore, diagnostics is

another important research area. Classical methods such as simple memory capacity tests do not lead to an unambiguous diagnosis in all cases. Newer methods, including biological markers in the cerebrospinal fluid or genetic tests are a lot more promising, but are not as frequently applied as the classical methods and need to be developed further.

In addition to medications that are able to delay the progression of diseases, it is envisaged that neural prostheses will be able to trigger the growth of nerve cells. It is expected that such microprobes for neurological stimulation will alleviate motor disorders associated with neurodegenerative disorders and contribute to the regeneration of nerves. These developments are financially supported by the BMBF as part of the cooperative "Neuromikrosonde" project. Implants that act as artificial synapses are being developed with the objective of replacing synapses and releasing second messengers.

Another major goal focuses on orphan drug research. Orphan drugs are drugs for the treatment of rare diseases. The smaller the demand, the less profitable research into such uneconomical drugs becomes and thus companies and researchers require more financial support - in particular on the EU level. Neurologists from Ulm are now in a position to benefit from this type of support for research into rare neurodegenerative diseases such as amyotrophic lateral sclerosis, Friedreich's ataxia, rare forms of Parkinson's disease and multiple sclerosis.

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## Dossier

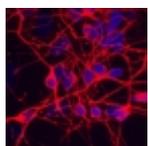
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