

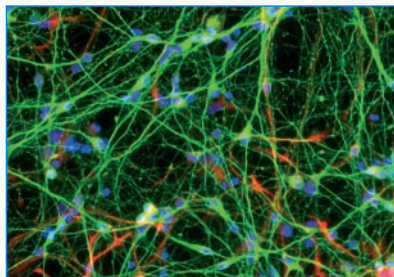
# Successful Through Collaborative Research

*At Bavarian Research Associations, universities team up with enterprises to jointly explore complex subject areas*

At Bavarian Research Associations, university institutions and enterprises increase their collaborative strength by working closely together. Their interdisciplinary approach serves to create synergies and boost creativity. With the support of public funding, the partners join efforts to search for solutions to scientific problems. Moreover, the Research Associations have become a breeding ground for young talents of the Bavarian economy. They offer the young generation of scientists future-oriented training opportunities and direct links to the industry. In the biotechnological sector, the research associations ForIPS, FORMOsA and ForBIMed are among these economic drivers. ■

### *ForIPS*

Neurological and psychiatric disorders such as Parkinson's disease pose significant therapeutic, social and health-economic challenges to society. Individuals afflicted by these diseases are often severely affected, experiencing far-reaching personal and social consequences. New and improved treatment options are needed to help these patients. The Bavarian Research Association ForIPS aims to investigate the pathomechanisms of Parkinson's disease and to develop and test new therapies. A further objective is the establishment of a



*ForIPS wants to have the induced pluripotent stem cells mature into new nerve cells (see picture). (© ForIPS) ■*

stem cell biobank. According to the spokesman of ForIPS, Dr. Jürgen Winkler, MD, Ass. Prof., Erlangen University Hospital, researchers at ForIPS focus on sporadic Parkinson's disease, the most common form of Parkinson's disease with over 85 percent of patients affected. Moreover, after Alzheimer's dementia, Parkinson's disease is the second most common neurodegenerative disease and leads to a loss of nerve cells playing an important role in the control of motoric functions. However, the molecular and cellular mechanisms responsible remain largely unknown.

### **iPS Cells - Cells Embarking on a Developmental Biological Time Travel**

Current therapy approaches can hardly stop the progression of the disease. The ForIPS researchers hope for new insights into the pathogenesis using the "Induced Pluripotent Stem Cells" technology (iPS) - one of the most

innovative biomedical developments of the recent years. With this technology, connective tissue cells of the patients can be re-programmed to the stage of pluripotency. As a result, patient-specific stem cells are generated and can be differentiated into organ-specific cells. The resulting neural cells further serve as a cellular model for the analysis of specific or individual disease causes, thus enabling the development of new treatment strategies. iPS cells are obtained from adult patients, which means that research using these cells is associated with fewer ethical issues than research projects with embryonic stem cells.

### **Deciphering Disease Processes**

In order to find new targets for therapeutic strategies it is essential to decipher the processes causing the disease. Scientists at ForIPS investigate the molecular and cellular mechanisms in the pathogenesis of sporadic Parkinson's disease in iPS-derived neural cells and search for new therapeutic approaches. In addition, researchers at ForIPS will establish a biobank for human iPS cells and will implement the iPS technology at the associated Bavarian universities. With this, an efficient platform for advanced investigation of brain diseases and other diseases may be created. ■

### FORMOsA

Many patients, especially those of older age, suffer from muscular atrophy. The pattern of the disease, as well as its treatment often poses a great challenge to medical professionals. Early detection is essential but diagnostic standards are missing and further research is needed in the field of therapy. The Bavarian Research Association FORMOsA was established with the purpose of investigating the causes of muscle atrophy as well as opportunities for its prevention. Furthermore, the project participants wish to develop new therapies and define new measurement standards for diagnostic purposes.

Muscle atrophy (sarcopenia) is a progressive loss of skeletal muscle mass and strength. The result is a



Muscle atrophy affects mostly older people, but not only (© iStockphoto) ■

limited physical performance, which leads to severe health and functional impairments. For example, the risk of falling and fracturing bones increases greatly. Some persons with this condition are still professionally active when their muscle strength begins to fade.

### A Tricky Diagnosis

Despite numerous cases, a substantial need for research in the area of disease causes as well as diagnosis and therapy exists. Until now, only few early stage risk factors are known. Trigger mechanisms can be identified for instance at the muscular, neuro-biological or hormonal level. Additionally, diet plays an important role. Currently, clinical examinations such as measuring the calf or upper arm circumference fail to reliably determine reduced muscle mass. Computed tomography and

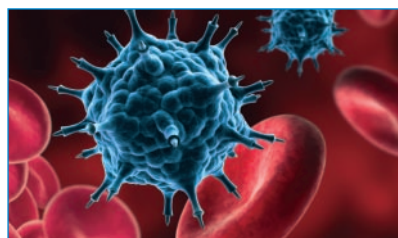
magnetic resonance imaging deliver reliable data, however, these methods are not suitable for everyday clinical practice.

### Development of a Complete Value-Added Chain

Within the framework of FORMOsA, nine scientific institutions and 18 industry partners cooperate closely to cover the entire value-added chain. This ranges from the production of biotechnological active ingredients to small and large animal models, and the development of techniques for diagnosis and treatment of muscle atrophy. The association's spokesman is Dr. Franz Jakob MD, Full Professor for Experimental and Clinical Osteology at the Orthopedic Department, University of Würzburg, Germany. ■

### ForBIMed

Despite the constant availability of new medications, improved vaccines and antibiotics, infectious diseases often spread rapidly claiming many deaths even in modern industrialised nations. There are several reasons for the persistence of infectious diseases. Many pathogens are highly adaptable, often develop multiple resistance to antibiotics or "escape the clutches" of conventional medicines and vaccines. It is biotechnology's duty keep up to date with these dynamic challenges.



Many viruses develop resistance to certain substances, thus rendering a number of medicines ineffective (© Fotolia) ■

### Biomarkers Reveal Pathogens

The objective of ForBIMed is to discover new, pathogen and host-specific biomarkers that can serve as a basis for new diagnostics, therapeutics and vaccinations. With these, ForBIMed aims to allow for a faster

and simpler distinction between bacterial and viral infections, as well as between resistance profiles within the different groups of pathogens. In addition, the characterisation of host specific immune parameters, based on which the risk of a transplant rejection or a virus reactivation while a patient is immune suppressed is assessed, represents one of the main focal points of this project. Within ForBIMed, eleven university research groups and ten companies work together, side by side, under the leadership of Dr. Ralf Wagner, PhD, Assoc. Prof., of the University of Regensburg. ■

### Competent Support with Research Funding

The Research Associations ForBIMed and FORMOsA make use of public funds provided by the Bavarian Research Foundation, whereas ForIPS is a beneficiary of the Bavarian Ministry of Science. Bavarian universities, higher education facilities, as well as small and medium-sized companies willing to apply for public funding are offered expert advice and support prior to, during, and following the submission of the application by the Bavarian Research Alliance (BayFOR). BayFOR supports Bavarian Research Associations in the area of public relations and assists the scientists involved in operating at the European level. Like the Bavarian Research Foundation, BayFOR is partner in the Haus der Forschung (House of Research) ■

[www.hausderforschung.bayern.de/en](http://www.hausderforschung.bayern.de/en)

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