

# Department of Neuroradiology

Director: Prof. Dr. Arnd Dörfler



**Universitätsklinikum  
Erlangen**



With its 33 clinics, departments and institutes, the University of Erlangen covers a broad spectrum of modern medicine. The university hospital of Erlangen provide a total of 1400 beds. Most departments are located near the garden of Erlangen Castle. Teaching, research and medical care are all interlinked with modern technology. Our patients benefit from state-of-the-art diagnostic modalities and most recent therapy strategies. Comprehensive quality assurance systems guarantee optimal medical care from admittance to patient discharge. 5,500 employees, including many interdisciplinary teams, are all committed to one common goal: alleviating pain and healing diseases.



## Modern diagnostic imaging and minimal invasive therapy of CNS disease



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The Department of Neuroradiology at the University of Erlangen-Nuremberg is highly specialized in the diagnostic radiological workup and minimal invasive therapies of central nervous system disorders, i.e. diseases of the brain, the spinal cord and their adjacent structures.

The imaging spectrum comprises examinations of blood vessels of the head and neck, cross-sectional imaging of the central nervous system and spine including examinations of the spinal canal with contrast medium (myelography), functional brain imaging as well as the entire spectrum of conventional diagnostic radiology. State-of-the-art imaging modalities are all available including high-field magnetic resonance imaging scanners, multidetector computed tomography scanners, a new biplane flat-panel detector angiography and latest post-processing hard- and software.

A major clinical and scientific focus is on the interventional (therapeutic) neuro-radiology with minimal invasive treatment of cerebrovascular pathologies of the brain (i.e. stenoses, aneurysms, AVMs, fistulae) and spine with stents, detachable coils and other materials. The clinical spectrum also includes the careful image-guided treatment of pain syndromes of the spine and vertebral column (i.e. facet joint and nerve root injections, vertebroplasty).

For medical emergencies an experienced neuroradiologist and technician are available 24 hours a day, 7 days a week as part of an interdisciplinary team.

## Acute stroke.

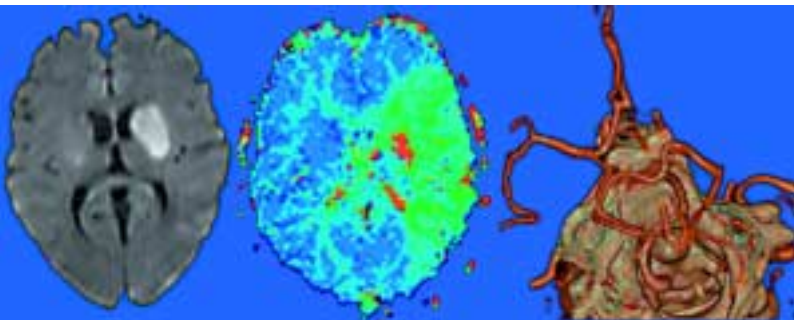
### Time is brain – every minute counts!

Cerebral stroke (apoplexy or cerebral ischemia) is one of today's most common medical emergencies. In fact, in industrialized Western countries it is the third most common cause of death after heart attacks and cancer. One of most common cause of stroke is the thromboembolic occlusion of a major cerebral artery.

The good thing - within the first few hours of stroke the blood clot (thrombus) occluding the cerebral artery can be dissolved with dedicated drug therapy resulting in recanalization of the former occluded vessel. However, for a beneficial patient outcome early diagnosis of cerebral ischemia with localization of vessel occlusion is mandatory.

Using modern imaging techniques such as multimodal CT and MRI we can reliably and accurately detect acute strokes in a very early stage. Subsequently, these patients can receive the most appropriate treatment without significant delay. In addition to MR angiography and CT angiography, special perfusion techniques are available to directly visualize cerebral blood flow thus revealing hypoperfused brain regions at risk for further damage.

Additionally, using special catheter systems and drugs (thrombolytic therapy) even severe cerebral vessel occlusions can be reopened, thus preventing irreversible ischemic brain damage.





## Monitoring arterial blood pressure by using brain MRI

### Effective prevention of stroke and dementia

In the discussion of preventive measures, public attention often focuses on cancer of the lung, gastro-intestinal tract and the breast. Preventive brain investigations are less known despite the fact that the brain is the best organ to measure blood pressure. In other words, the brain does not allow high blood pressure to occur over longer periods of time without structural consequences. Magnetic resonance imaging (MRI) is able to directly visualize these consequences of high blood pressure, even in its early stages.

The Department of Neuroradiology offers non-invasive preventive investigations of the brain and neck for patients with high blood pressure in order to detect vascular pathologies (stenoses, cerebral microangiopathy) and prevent future strokes. Both of these disorders often lead to dementia due to undetected or poorly adjusted high blood pressure. The positive aspect of cerebral microangiopathy is that its main risk factor, i.e. “high blood pressure,” is treatable.

Importantly, MR screening of cerebral vessels can be essential for anyone whose relatives have already suffered a cerebral hemorrhage, since there is an increased inherited risk of dangerous cerebral aneurysms.

## Keyhole surgery without knife. Minimal invasive treatment of cerebrovascular disease

In the Department of Neuroradiology approximately 800 catheter angiographies were performed each year. During these painless examinations, the blood vessels supplying the brain and spine are carefully selectively catheterized by a femoral approach and visualized by injection of contrast agent.

Minimal invasive therapies of cerebral and spinal vascular disorders are performed in approx. 200 patients each year. These procedures involve pushing special balloons or metallic prostheses commonly known as “stents” through the catheter to treat stenosed arteries resulting in an improved blood flow and prevention of stroke.

Some vascular diseases result in aneurysms at the weak points of a cerebral artery. The rupture of an aneurysm results in a critical subarachnoid hemorrhage. A minimal invasive method of treating this condition is to fill the aneurysm with dedicated electrically detachable platinum coils through a microcatheter thus avoiding invasive surgical treatment with opening the patient’s skull. Commonly referred to as “coiling”, this elegant technique of endovascular aneurysm treatment is a unique specialty of the Department of Neuroradiology there established for many years.





Lower back pain.

## Image-guided minimal invasive therapy of spinal pain disorders

Image-guided minimal invasive infiltration therapies are integral part of the interdisciplinary management of spinal pain syndromes. By using CT or X-ray infiltrations of anti-inflammatory and analgetic drugs can be precisely navigated and controlled. By this way, pain could be effectively interrupted or alleviated in many patients. These therapies are preferably performed on the small vertebral joints (“facet joint block”) of patients suffering from chronic lower back pain. Additionally, the periradicular infiltration of nerve roots (periradicular therapy) close at the intervertebral foramen is another effective method in the treatment of radicular pain syndromes caused by disk protrusions or osseous foraminal stenoses. Vertebral compression fractures, especially in patients suffering osteoporosis, metastases or tumors, stabilization of the vertebral body can be achieved by a minimal invasive percutaneous approach with selective injection of bone cement into the vertebral body. In many cases, this procedure does not only remove the pain but also renders surgery unnecessary. One day after vertebroplasty, patients usually can move around and are painfree.

# Office hours

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## **Private consultations**

Prof. Dr. Arnd Dörfler

Monday to Friday, 8:00 a.m. to 3:00 p.m.

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## **Special consultations**

- Cerebrovascular diseases  
(i.e. Stenoses, Aneurysms, AVMs)
- Brain tumors
- Epilepsy
- Lower back pain
- Prevention (brain, cerebral and cervical vessels, head&neck)

Monday to Friday, 8:00 a.m. to 3:00 p.m.  
by appointment

For an appointment please contact  
our secretary

Phone: ++49 (0) 9131-85-39388





## Providing optimal safety and high quality by using state-of-the-art imaging techniques

For best diagnosis and careful therapy the Department of Neuroradiology has the most modern imaging techniques available. Imaging modalities available include high-field MR scanners, multidetector CT scanners and the most advanced flat-panel detector biplane angiography system with an integrated CT capability (Axiom Artis dBA; DYNAVISION).

In **computed tomography (CT)**, the patient's head is scanned either in slices or in spirals. Using dedicated computer post-processing data are converted to cross-sectional images. Even slight differences in tissue density can be detected and further intensified by administration of iodinated contrast medium. In addition, CT angiography (CTA) rapidly provides important vascular information, such as carotid artery or intracranial vessel stenosis or occlusion, cerebral aneurysms, venous sinus thrombosis or arteriovenous malformations.

In **magnetic resonance imaging (MRI)**, the information is not acquired with X-rays, but rather through magnetic excitation of protons. This enables the neuroradiologist to recognize even very subtle changes which may have occurred e.g. in patients with epilepsy, multiple sclerosis or tumors. Using special MR angiographic (MRA) techniques, the cervical and cerebral vessels can be displayed without the risk of conventional catheter angiography. In addition, MRI can be used to investigate brain functions (functional MRI) and metabolic processes (MR spectroscopy).

A state-of-the-art **biplane flat-detector angiography system** with an integrated CT capability was recently added to the imaging modalities available in the Department of Neuroradiology further supporting precise and reliable diagnosis and safe and effective endovascular therapy of cerebrovascular disorders.

# How to find us

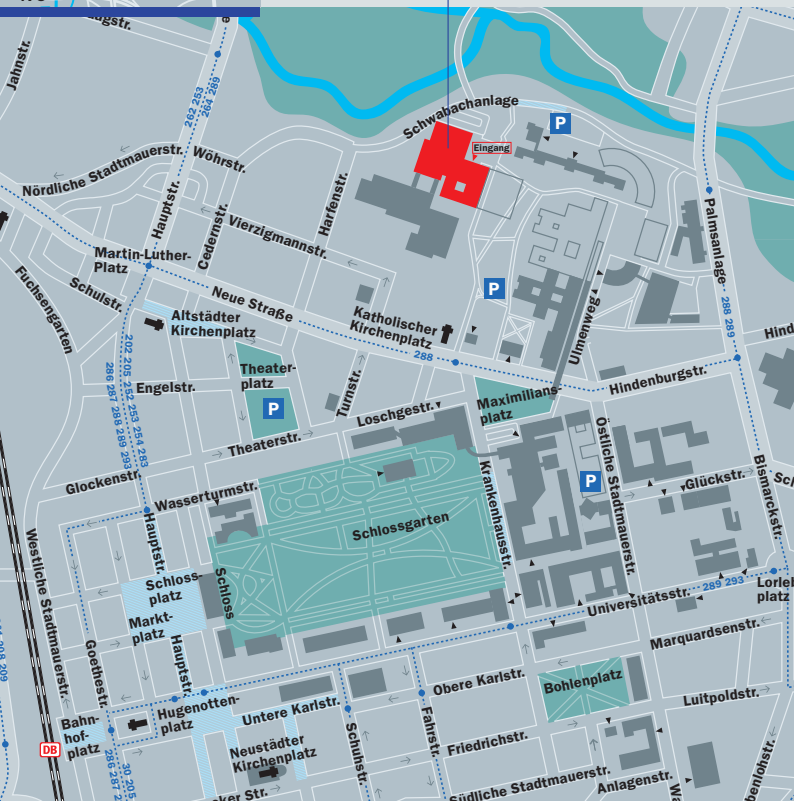
## By car

From Interstate A73, take the exit “Erlangen-Nord” and then follow the “Uni-Klinikum” and “Neurologie” signs. Once you reach the grounds of the University Hospital, follow the “Neuroradiologie” signs. Both short-term and all-day parking spots are available in the hospital area. Long-term parking spots are available on the large parking lot located to the west of Erlangen central railway station.



## By train

Erlangen central railway station (ICE connection) is located approx. 1000 m from the Department of Neuroradiology. The name of the nearest bus stop is “Maximiliansplatz/Kliniken”.



# Emergencies

For medical emergencies an experienced neuroradiologist and technician are on call 24 hours a day, 7 days a week.

In case of emergency, you can contact us by telephone outside of office hours at any time by dialing:

**++49 (0) 9131 85-33001**

## Department of Neuroradiology

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