

and there will be intracerebral haemorrhage. When bleeding into the subarachnoid space the intracranial pressure increases and the perfusion worsens. Some regulatory mechanisms are activated and these will provide the adequate amount of oxygen supply to the brain. In the area of haemorrhage vascular spasm might occur and this might lead into a secondary brain infarction. In this case the infarction is a complication of the original disease. Examination of the cerebrospinal fluid reveals blood and pink supernatant that remains after centrifugation due to erythrocyte haemolysis. After 24 hr. xanthochromia appears (yellow discoloration of the CSF due to degeneration products of the blood).

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## 6.16 Aging changes and brain tissue atrophy

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We know that brain tissue **atrophy** begins in the 3rd decade and the morphological changes of the brain tissue are associated with **aging**. The brain volume decreases by 2–3% for every 10 or 20 years and by about 100 g wt from the 30th year of age. It is necessary to mention that these results were collected from many studies and still they don't contain a wide scale of variability in relation to individual characteristics, life style, geographical and other conditions.

Macroscopically the brain of older people is smaller (the normal weight is about 1380 g in men and 1204 g in women), the arachnoid mater is thicker with a higher number of granulations, the subarachnoid space is thickened, the gyri are narrow and on the contrary the sulci are wide (normally it's the opposite). The most important microscopic aspect is the reduction of neocortical neurones, as well as the reduction of the number of Purkinje cells layers of the cerebellum and the motor cells of the spinal cord. In cases of **senile dementia** (as well as in cases of **senile Alzheimer dementia**) these signs are very remarkable. Yet if the dementia occurs in any age, it's always accompanied with **degenerative or atrophic changes** of the brain.

Dementia is clinically manifested with disturbance

of memory, new memory and disturbance of the intellectual functions. This gradual disorientation worsens progressively and relatively fast and hence the stage of complete dementia can develop within few years. The wide variability of manifestations of the clinical picture points to the fact, that these changes are not merely related to age. There is probably some multifactorial process. We suppose that a common incidence is related to a high incidence of cardiovascular diseases. Even in those diseases many hereditary factors as well as factors of the external environment could be more accurately specified.

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## 6.17 Infections

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CNS infections are in comparison with infections of other localities very rare diseases. The course of CNS infection can be asymptomatic with some minimal pathological changes (e.g. viral infections), yet the course of the infection might be very difficult and may lead to a permanent dysfunction and death.

Generally we divide the infectious diseases of the CNS according to their localization into two groups, those which can cross the barrier formed by pia mater, such as diseases of the meninges (**meningitis, empyema and abscess**), and those diseases affecting the brain tissue (**encephalitis and abscess**). The etiopathological agents are usually bacteria, viruses and mixed infections.

### 6.17.1 Bacterial infections

1. **Infections that usually spread via blood.** Very common infections to occur this way are infections in the area of subarachnoid space (meningitis) that can be **pyogenic** (e.g. meningococci, pneumococci and haemophilus), and **granulomatous** (e.g. tbc, treponema pallidum). If the bacteria set directly in the brain tissue a brain abscess will form, that could be of two types (**pyogenic** – mixed infection, staphylococcal infection, or **granulomatous** – tuberculous).
2. **Infections that cross the blood brain barrier due to the destruction of the protective tissues** (dis-