

# Biological properties of tumors

The biological behavior of a tumor means above all its behavior in relation to the host. From this point of view, they distinguish two extreme forms:

- **benign tumors** - benign, their behavior is biologically favorable
- **malignant tumors** - malignant, their behavior is biologically unfavorable

This division originates in the macroscopic appearance. Tumors originally described as benign were mainly characterized by a well-formed capsule and thus allowed relatively safe surgical removal. Today, however, we know that although well-encapsulated tumors are generally less likely to spread and vice versa, this is not a completely sure sign. A sign of malignancy is considered to be the ability of the tumor to spread, a much better correlate is the histopathological picture and possibly molecular markers.

In addition to this split, other categories appear:

- **semimalignant tumors, borderline tumors** - tumors of uncertain biological behavior
- **pre malignancy, precancer** - a condition that is not a tumor, but there is a higher risk of turning into a malignant tumor
- **topically malignant tumors** - tumors that are benign in their behavior, but growing in places where their expansion itself threatens the patient's life; typically these are intracranial tumors

Some benign tumors can develop into malignant tumors over time, e.g. intestinal polyps are places with the risk of developing intestinal cancer, other benign tumors have the same risk of turning into malignancy as healthy tissue, e.g. uterine leiomyomas. Finally, a number of malignant tumors can arise in healthy tissue. Therefore, it is definitely not possible to claim that a benign tumor is a precursor to a malignant tumor, although this is sometimes the case.

## Benign tumors

In general, benign tumors tend to grow slowly, compactly, and not spread. However, it should be remembered that there are exceptions, e.g. malignant bone tumors can grow relatively slowly.

### Macroscopic appearance

- sharply demarcated from the surroundings, usually spherical, ovoid
- epithelial tumors tend to be gray-white and solid
- Mesenchymal tumors tend to be similar to the original tissue
- they are often encapsulated, the capsule is formed as a result of the compression of the surrounding tissues

### Features and Spread

- slow growth
- do not establish metastases
- expansive growth, i.e. the tumor grows as a whole, pushing the surroundings

### Complications

- oppression of the environment - limitation of joint mobility, atrophy of the environment
- causes intracerebral hypertension in the brain
- release of hormones (pheochromocytoma, pituitary adenoma)
- bleeding (hemangioma)
- soreness (osteoid osteoma)

## Malignant tumors

Malignant tumors are usually more characterized by the fact that they are not sharply defined, they spread, necrosis occurs more often in the parenchyma. Their growth is more often abrupt, histologically, with the development of a tumor, the similarity to the original tissue may gradually be lost.

### Macroscopy

- vaguely demarcated from the surroundings, it is impossible to determine exactly what is a tumor and what is healthy tissue
- epithelial - carcinomas grey-white, solid
- mesenchymal - sarcomas with a fish flesh appearance
- necrosis and bleeding in the parenchyma occur more often

### Biological properties

- they relapse
- rapid growth
- spreads to the surrounding area
- establish metastases
- cachectizing effect (patient loses weight).

## **Spread of malignant tumors**

Spreading is one of the basic characteristics of a malignant tumor. For didactic and practical reasons, a distinction is made between continuous spread, in which the continuity of the tumor mass is preserved, and discontinuous spread, in which distant secondary tumors arise.

The spread of metastases is quite characteristic for some tumors. Sometimes the first manifestation of a tumor can be the clinical manifestation of metastasis, e.g. bronchogenic carcinoma is often manifested only by neurological symptomatology caused by metastatic involvement of the brain (epileptic seizure, incontinence,...).

From the point of view of the target tissue, metastases are sometimes divided into:

- homotopic - metastases are to the same tissue from which the primary tumor originates
- heterotopic - metastases are to a different tissue than the one from which the primary tumor originates

## **Links**

### **References**

- STŘÍTESKÝ, Jan. *Patologie*. 1. edition. 2001. ISBN 80-86297-06-3.