Pathology

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Pathology

- pathos (πάθος) + -logia (-λογία) = suffering + science
- study of the causes and effects of **disease** or injury

Pathologist

- studies the cause (**etiology**), development (**pathogenesis**) and structural alterations (**morphology**) of diseases
- produces **diagnosis** based on his findings
- not a forensic medicine

- the key to the diagnosis are **morphological findings** (macroscopy, microscopy and even molecular alterations)

- **interconnection** of theoretical and clinical fields of medicine
  - utilization of theroretical subjects in clinical cases

Pathology department

- part of faculty and major hospitals
- contains 3 main complexes:

1) Biopsy laboratory

2) Autopsy tract

3) Education

Pathology department

1) Biopsy laboratory

- 85 % of work
- analysis of bioptic and cytologic samples (**living** patients)
- sample **preparation** and **examination**

- contains several laboratories:

1) Histopathology lab
2) Cytology lab
3) Histochemistry
4) IHC lab
5) Molecular lab

Pathology department

1) Biopsy laboratory

- **routine samples**
  - gallbladders, appendices, lipomas, tonsils, uterine leiomyomas...
- **biopsies**
  - endoscopy samples, needle and puncture biopsies
- **cytology**
  - smears, lavage
- **resection speciemens**
  - organ complexes = conization of cervix, thytoid gland, GIT resections, kidneys, skin excisions, lungs...
- **frozen sections**
  - peroperative biopsies (determine radicality of surgery)
- **molecular studies**
  - predictive pathology

Pathology department

2) Autopsy tract

- provision of **clinical (dis)sections** (autopsies)
- allows **necropsy** examination (samples taken post mortem)

1) Dissecting room

2) Autopsy lab

Pathology department

2) Autopsy tract

"not every autopsy is the same"

- **anatomical autopsy** (provided by anatomy department)

- **clinical autopsy** (provided by pathology and forensic medicine department)

- **forensic autopsy** (provided by forensic medicine department)

Pathology department

3) Education

- **pregradual** education
  - med students, laboratory assistants, nurses, physiotherapists
- **postgradual** education and training
  - PhD students, pathology and forensic medicine trainees

Fields of pathology

1) General pathology

- seeks to understand the **general mechanisms** of diseases

2) Special pathology

- describes **particular diseases** of every organ system
- pathologists needs to know diseases of all sites

Pathology examination

- there are several **levels** of pathological changes:

1) Macroscopy (anatomical pathology)

- changes prone to the **naked eye**

2) Microscopy (histopathology)

- changes on the cellular level (**microscope** is required)
- includes several diagnostic methods

3) Ultrastructure

- **subcellular** changes and **genetic** aberrations
- includes several diagnostic methods

Pathology examination

1) Macroscopy (anatomical pathology)

- changes prone to the **naked eye**
- anatomical abnormalities (dissection, specimen trimming)

Pathology examination

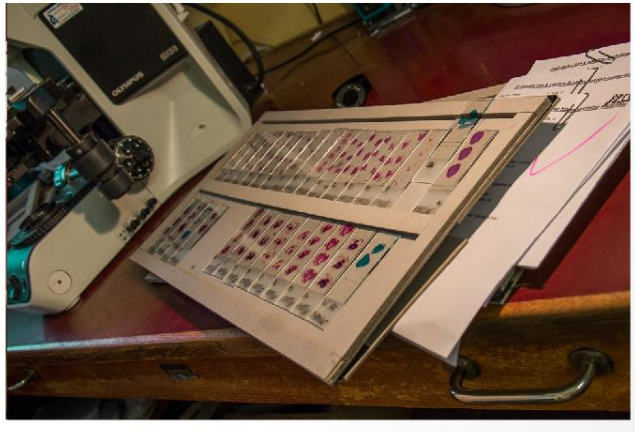
2) Microscopy (histopathology)

1) Classical "histological" examination

- fixated and stained tissue sections analysed with a light microscope
- HE + special methods (trichrome, Berlin blue, Orcein, AB-PAS...)

2) Cytologic evaluation

- analysis of the isolated cells
- body fluids, lymph n., cervix, thyroid, salivary glands... (smears, lavages)



Pathology examination

3) Ultrastructure

1) Electron microscopy
- subcellular features visible
- requires ultra-thin sections

2) Flow cytometry
- laser detection of protein expression

3) Molecular methods
- relatively new field of pathology
- detection of genetic aberrations

(FISH, Western blotting, DNA sequencing, PCR...)

Pathology examination

3) Ultrastructure

4) Histochemistry
- visualization of enzymes and other substances
- native tissue tends to be required

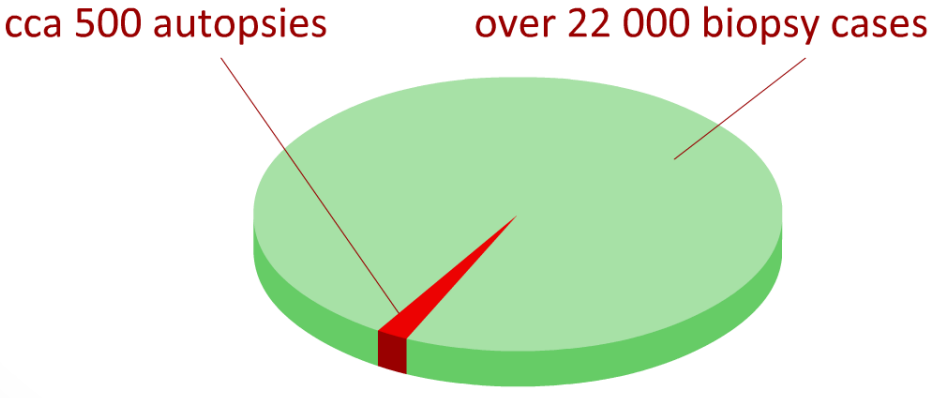
5) Immunohistochemistry
- identifying antigens (proteins) in a tissue section by binding of specific antibodies and their visualisation

Conclusion

- pathology is a **morphological** science with clinical usage
- pathologists use a wide spectrum of methods for **diagnostic purposes**

- the majority of diagnoses produced in pathology is for **living patients**
  = cca 20 % of diagnoses in hospital (almost 100 % of tumour dg.)

- **cooperation** with clinicians is necessary



statistic graph of patients in our department (2015)

Literature

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