**LECTURE SYLLABUS**

**(General medicine)**

**Pathophysiology of the endocrine system**

Endocrine glands

Hormones

Inactivation/elimination of hormones

**Effects of hormones**

- Organization

- Activation

**Regulation in the endocrine system**

Nerve regulation

Simple or complex negative feedback (oscillations)

Positive feedback – e.g. oxytocin during delivery

Regulation with another hormone

Physiological regulatory mechanisms can play a role in pathogenesis of some diseases.

**Causes of endocrine diseases**

Developmental abnormalities

Mutations in genes for peptide hormones, enzymes necessary for hormone synthesis or for receptors

Injuries

Inflammation

Tumours

Vascular disorders

Iatrogenic (surgery, hormone administration

Disorders of gland regulation

Trophic changes (consequence of long-term change of regulation)

**Classification of endocrine disorders**

Primary

Secondary

Tertiary

**Functional changes**

Eufunction

Hyperfunction

Hypofunction

Dysfunction (combination of hyper- and hypofunction of several hormones)

**Mechanism of functional changes**

Change of synthesis, release or distribution of the hormone

Disorder of degradation or excretion of the hormone

Exogenous origin of the hormone

Ectopic secretion of the hormone

Change of sensitivity of target tissue

**Common manifestations of endocrinopathies**

metabolic disorders

growth and development abnormalities

changes of body weight

deterioration sexual functions

mental changes

skin symptoms

drop of physical fitness, fatigue

trophic changes

**Neurosecretion**

= production of hormones by neurons

**Hypothalamus – hypophysis system**



**Hypothalamus - neurohypophysis**

Synthesis of hormones in the nc. supraopticus and nc. paraventricularis of the hypothalamus: oxytocin, vasopressin

Axonal transport into the neurohypophysis

**Vasopressin (ADH)**

Central diabetes insipidus

Renal diabetes insipidus

Syndrome of inappropriate secretion of ADH (SIADH, Schwartz-Bartter sy)

**Hypothalamus - adenohypophysis**

Growth hormone

Lack of GH

– during growth period → nanism

Resistance to GH = Laron's nanism (normal or ↑ GH)

Excess of GH

1. In children → gigantism

2. In the adulthood → acromegaly

Prolactin

↑ of prolactin → galactorrhea-amenorrhea syndrome

Thyroid gland – T-hormones

Hyperthyroidism

Hypothyroidism

- in childern

- in adults

Diseases without thyroid gland function changes = euthyroidism

Goiter

Antithyroidal substances

Thyroid gland nodes

Euthyroid sick syndrome

**Hormones regulating calcium metabolism**

Hypocalcemia, hypercalcemia

Parathormone

Calcitonin

Vitamin D

**Adrenal gland**

Adrenal medulla

Adrenal cortex

Glucocorticoids

Mineralocorticoids

Androgens

Cushing’s syndrome

Addison’s disease

Conn’s syndrome

**Sex hormones**

Menstruation disorders

**Pubertas praecox**

- preliminary release of gonadotropins, mostly due to hypothalamic disorder

- imitates normal puberty

**Pseudopubertas praecox**

- preliminary development of secondary sex features without gametogenesis due to the effect of androgens in boys and estrogen in girls

Delayed or missing puberty

Disorders of sexual differentiation

- Hermaphroditism

- Pseudohermaphroditism

Chromosomal aberrations of the gonosomes

Insufficient activity of sex hormones

- hypogonadotropic hypogonadism

- hypergonadotropic hypogonadism

Excessive secretion/effectivity of sex hormones

**Hormones regulating glycemia**

Insulin

Glucagon

Glucocorticoids

Growth hormone

Epinephrine, norepinephrine

T-hormones

**Other hormones**

VIP

Gastrin

Somatostatin

Melatonin

Erythropoietin

Natriuretic factors