**SYLABUS OF LECTURE**

**(General medicine)**

**Pathophysiology of nutrition**

**Energy metabolism**

* Intake of saccharides, lipids, proteins
* Direct using of energy; storage
* Energy deposits: adipocytes (triacylglycerols), hepatocytes and muscle cells (glycogen)
* Anabolism x catabolism
* Units: calorie (cal); joule (J) ; 1 cal = 4,2 J

**Saccharides** (carbohydrates)

* Metabolism (see physiology + biochemistry)
* Carbohydrates metabolism disorders
* Hypoglycemia = blood glucose < 3,0 mmol/l; enzymopathies, endocrinopathies, tumors, alcoholics, drugs, starvation
* Hyperglycemia = blood glucose > 7,0 mmol/l; diabetes mellitus, ↑ intake of carbohydrates, stress, endocrinopathies (glucocorticoids → steroid diabetes, adrenaline, glucagon, GH, T-hormones)

**Lipids** (fats)

* Metabolism (see physiology + biochemistry)
* Lipids metabolism disorders
* Dyslipidemia – pathological ↑ or ↓ of blood lipoproteins level; risk factor for aterosclerosis and complications (= ischemic heart disease, ictus)

**Proteins**

* Metabolism (see physiology + biochemistry)
* Protein metabolism disorders

depletion → protein malnutrition (kwashiorkor)

surplus → ↑ urea + ammoniac (liver, kidney)

**Regulation of food intake and energy storage**

* Complex neuroendocrine interaction
* Hypothalamus = food and energy homeostasis center (see physiology)

**Obesity**

* Excess of body fat → negative consequence for health development
* Consequence of positive energy balance
* 95% multifactorial etiology = primary obesity
* Polygene background, interaction between external and internal factors
* Most important factors for phenotype: ↑ energy intake from food, ↓ physical activity (= sedentary lifestyle), abnormal feeding behavior

Complications

* Insulinoresistance → diabetes mellitus (2nd type) + cardiovascular diseases
* Etiopathogeny: endocrine dysfunction of fatty tissue (hypertrophic adipocytes - ↑ proinflammatory and proatherogenic adipokines)
* Ectopic accumulation of lipids (liver, skeletal and cardiac muscle, pancreas)
* Inflammatory reaction (↑ TNF-α, IL-6, PAI-1, angiotensin II, leptin)
* Hypoxia of fatty tissue → ↓ pO2 → ↑ proinflammatory adipokines + ↑ angiogenesis, ↓ aerobic + ↑ anaerobic glycolysis → ↑ lactate, ↑ infiltration by immunocompetent cells → local inflammation

**Inanition**

* Selective ↓ 1 nutrient x long-term ↓ all nutrients
* ↓ body weight > 40% = serious prognosis
* Depletion = ↓ macronutrients (saccharides, lipids, proteins) or micronutrients (vitamins, minerals, trace elements)
* Malnutrition = insufficient quantity (or unbalanced intake) of nutrients → pathology
* Starvation (marasm) = ↓ body weight (muscles + fatty tissue) resulting from long-term ↓ intake (nutrition support is effective)
* Cachexia = ↓ body weight during chronic disease (AIDS, tumors, sepsis), ↑ morbidity + mortality (nutrition support usually ineffective)
* Sarcopenia = ↓ muscle mass + ↓ muscle power and movements (aging - ↓ TEST, GH, proteins, vit. D)
* Anorexia = ↓ appetite (reduction of food intake) + chronic disorder, drugs; without hunger ! (x anorexia nervosa, mental a.)

**Food intake disorders**

Etiopathogeny

* Biological factors (genetic background, women, puberty…)
* Psychological factors (stress, family, typology - emotions…)
* Social factors (pressure from society, ideal of beauty - negative body image…)

**Anorexia nervosa (mental anorexia)**

* Eating disorder resulting in severe weight loss
* Typical signs - ↓ body weight (BMI < 17, 5), behavioral changes, amenorea
* Psychopathology: eating an extremely low calorie diet, excessive fear of gaining weight; often better feeling about themselves when they lose weight; also excessive exercise

**Bulimia nervosa**

* Generally characterized by binge eating followed by purging
* Purging can occur through forced vomiting, excessive exercise, taking laxatives or diuretics.
* Usually is developed from mental anorexia
* Psychopatology: unrealistic body image, obsessions with their weight and are intensely self-critical; many people with bulimia are of normal weight or even overweight.

**Refeeding syndrome**

* Serious metabolic complication caused by disproportionate ↑ realimentation
* Pathogeny - reaction to rapid change of metabolism (lipids → carbohydrates)
* ↑ insulin secretion, hypophosphatemia, hypomagnesemia, hypokalemia