

Anhang 1 / Appendix 1

Catalogue of Learning Objectives

Swiss Society of Allergology and Clinical Immunology

Weightage

Core knowledge

Specialty-specific knowledge

Theoretical knowledge

Definition of knowledge levels (Capital letters)

- **Level A: basic knowledge**
 - Prerequisite (for all candidates)
 - e.g. anaphylaxis (M; C; D; X; L; T; E; P)
- **Level B: extended knowledge**
 - Required (for all candidates)
 - e.g. Wegener Granulomatosis (C, D, X, L)
 - e.g. Arteriitis temporalis (C; D; X; L; E)
- **Level C: special knowledge**
 - Recommended; knowledge according to second specialty (organ (e.g. skin, ENT) or age group (e.g. pediatrics))
 - Multiple sclerosis (C, X)

Definition of specific contents (lower case letters)

- **Demonstrates general knowledge (letter g)**
 - Is able to give basic, not detailed information
- **Knows and explains mechanisms (letter m)**
 - Detailed knowledge on immunological and non-immunological pathomechanisms
- **Knows clinical manifestations (letter c)**
 - Detailed knowledge on history, symptoms and signs of a disease
- **Makes clinical diagnosis (letter d)**
 - Is able to personally establish the clinical diagnosis, applies further investigative methods
- **Considers differential diagnosis (letter x)**
 - Knows the relevant differential diagnoses
- **Applies laboratory/technical diagnostic tools (letter l)**
 - Detailed knowledge on indication, relevance, and diagnostic value, basic knowledge on technical issues
- **Performs practical procedures (letter p)**
 - Knows, indicates and personally performs diagnostic tests
- **Indicates/performs treatment (letter t)**
 - Knows, indicates and personally performs therapy
- **Takes emergency measures (letter e)**
 - Assesses emergency situations and performs adequate interventions

1 Basics and methods in Allergology and Immunology

1.1 Historical evolution (A, g)

**1.1.1 Historical definition of allergy (v. Pirquet 1906)
Comparison to actual definition**

**1.1.2 Historical definition of anaphylaxis (Richet and Portier 1902)
Comparison to actual definition**

1.1.3 The term “atopy” (Coca and Cooke 1923)

**1.1.4 Classification of allergic reactions according to Coombs and Gell (1963)
Comparison to actual definition**

**1.1.5 Discovery of important elements of the immune system: antibodies, complement and lymphocytes
Comparison to actual definition**

1.1.6 Discovery of important elements of allergic reactions:

1.1.6.1 Histamine (1910)

1.1.6.2 Prausnitz-Küstner Phenomenon (1921)

1.1.6.3 Immune globulin E (1966)

1.1.6.4 Leukotrienes (1979)

1.1.6.5 Anti-IgE (2003)

1.2 Terminology (A, m)

1.2.1 Immunity

1.2.1.1 Innate immunity

1.2.1.2 Adaptive immunity (antigen-specific immunity)

1.2.2 Pharmacological intolerance

1.2.3 Non IgE-mediated allergy/pseudo-allergy/idiosyncrasy

1.2.4 Allergy

1.2.5 Antigen and antibodies

1.2.6 Allergens; major and minor allergens

1.2.7 Component-resolved allergy diagnosis (molecular diagnostics)

2 Components of the immune system

2.1 Organs of the immune system (A, g)

2.1.1 Primary lymphatic organs

- 2.1.1.1 Thymus
- 2.1.1.2 Bursa fabricii and equivalents

2.1.2 Secondary lymphatic organs

- 2.1.2.1 Spleen
- 2.1.2.2 Lymph nodes and lymphatic system

2.1.3 Local immunity

- 2.1.3.1 Respiratory mucosae (nose, lung)
- 2.1.3.2 Gastrointestinal mucosae (mucosa-associated lymphatic tissue, MALT)
- 2.1.3.3 Skin (skin-associated lymphatic tissue, SALT)

2.2 Cells of the immune system (A, g)

2.2.1 Myeloid cells

- 2.2.1.1 Eosinophilic granulocytes
- 2.2.1.2 Neutrophilic granulocytes
- 2.2.1.3 Basophilic granulocytes
- 2.2.1.4 Mast cells
- 2.2.1.5 Mononuclear phagocytes
- 2.2.1.6 Dendritic cells

2.2.2 Lymphocytes

- 2.2.2.1 T lymphocytes (T helper, cytotoxic and regulatory T cells)
- 2.2.2.2 B lymphocytes and plasma cells
- 2.2.2.3 Natural killer cells (NK cells)

2.2.3 Involvement of other cell types in immunological reactions (examples)

- 2.2.3.1 Thrombocytes
- 2.2.3.2 Epithelial cells
- 2.2.3.3 Endothelial cells
- 2.2.3.4 Fibroblasts

2.3 Immunoglobulins: structure, functions (A, m)

2.3.1 Immunoglobulin classes and subclasses

2.3.2 Principles of immunoglobulin structure (using the example of IgE)

- 2.3.2.1 Constant region – variable region – hypervariable region
- 2.3.2.2 Heavy chain – light chain
- 2.3.2.3 Fc region – Fab region

2.3.3 Function of immunoglobulins

- 2.3.3.1 Antigen binding; diversity of antigen binding sites by somatic recombination
- 2.3.3.2 Complement activation, antibody dependent cellular cytotoxicity
- 2.3.3.3 Communication via Fc receptors
- 2.3.3.4 Functions of membrane-bound immunoglobulins

2.4 Antigen-antibody reaction, immune complexes (A, m)

2.4.1 Principles of antigen-antibody reaction: affinity, avidity, kinetics

2.4.2 Principle of immune complex formation

2.4.3 Physiological elimination of immune complexes

2.4.4 Reasons for and consequences of pathological immune complex formation

2.5 Mediators/cytokines (C, g)

2.5.1 Histamine, mast cell tryptase

2.5.2 Bioactive lipids (particularly arachidonic acid metabolites)

- 2.5.2.1 Leukotrienes
- 2.5.2.2 Prostaglandins

2.5.3 Serotonin

2.5.4 Bradykinin-kallikrein system

2.5.5 Acute phase proteins

2.5.6 Cytokines

- 2.5.6.1 Pro-inflammatory cytokines
- 2.5.6.2 Regulatory cytokines; Th1 / Th2 / Th17 model
- 2.5.6.3 Chemokines

2.5.7 Soluble membrane proteins

2.6 Complement system (A, g)

2.6.1 Classical pathway: cascade and activation

2.6.2 Alternative pathway: cascade and activation

2.6.3 Common final pathway (C5-C9)

2.6.4 Anaphylatoxins (C3a, C5a)

2.6.5 Regulatory molecules (C1 esterase inhibitor and others)

2.6.6 Function and significance in allergic disorders

2.6.6.1 Cytolytic functions (C5b-C9 complex)

2.6.6.2 Activation of cells by soluble complement degradation products (anaphylatoxins C3a, C5a)

2.6.6.3 Lysis of immune complexes by complement

2.6.6.4 Immune adherence and activation of cells by bound complement degradation products (particularly C3b)

2.7 Regulation of antibody synthesis (A, g)

2.7.1 Role of genetics in antibody synthesis (using the example of IgE)

2.7.2 Role of natural/early antigen exposure

2.7.3 Influence of antigen type (e.g. peptides, carbohydrates, lipids)

2.7.4 Regulation by T lymphocytes (and their cytokines)

2.8 Cellular cooperation and regulation of immune response (A, g)

2.8.1 T-B-cell cooperation in antigen presentation

2.8.2 T-B-cell cooperation in antibody synthesis

2.8.3 Antigen presentation by MHC class II and dendritic cells to T cells

2.8.4 Antigen presentation by MHC class I and antigen presenting cells to T cells

2.8.5 Cooperation between dendritic dermal cells and infiltrating cells (selected examples)

2.9 Immunological reaction types (A, g)

2.9.1 Humoral immunity and reactions

2.9.2 Cell-mediated immunity and reactions

2.10 Immune deficiencies and disturbances in regulation (A, g)

2.10.1 Deficiencies in humoral, B cell-mediated immunity

2.10.2 Deficiencies in cellular, T cell-mediated immunity

2.10.3 Combined immune deficiencies of T and B cells (SCID)

2.10.4 Deficiencies in granulocytes and macrophages

2.10.5 Congenital neutropenias

2.10.6 Complement deficiencies

2.10.7 Mannose-binding lectin (MBL)

2.10.8 Hyper-IgE syndrome (Job's syndrome)

2.10.9 Local disturbances of mucosae

2.10.10 Acquired immune deficiencies

2.10.11 Human immunodeficiency virus (HIV)

2.11 Immune tolerance and autoimmunity (A, g)

2.11.1 Development of tolerance of B cells

2.11.2 Development of tolerance of T cells

2.11.3 General characteristics of T and B cell tolerance (induction, antigen dose, antigen persistence, specificity, duration)

2.11.4 Autotolerance and physiological autoimmunity

2.11.5 Mechanisms of tolerance loss

2.11.6 Factors in the development of autoimmune diseases

2.11.6.1 Immunogenetic factors

2.11.6.2 Realization factors in autoimmune disorders

2.11.7 Spectrum of autoimmune disorders

2.11.8 Tolerance in transplantation medicine

2.11.8.1 ABO blood groups, HLA compatibility

2.11.8.2 Tolerance induction

3 Allergology

3.1 Methods in allergology (A, g)

3.1.1 Epidemiology of allergic disorders

- 3.1.1.1 Basic terms: prevalence, incidence, mortality / lethality
- 3.1.1.2 Epidemiology of respiratory allergies, atopic dermatitis (atopic eczema), allergic contact dermatitis, drug hypersensitivity reactions, Hymenoptera venom allergy, food allergies and intolerances, anaphylaxis, urticaria, angioedemas, mastocytosis

3.1.2 Allergen characterization and distribution (A, m)

- 3.1.2.1 Allergen sources
 - 3.1.2.1.1 Respiratory allergens, food allergens, contact allergens, drugs / medication, insect venoms, occupational allergens
- 3.1.2.2 Characterization of protein allergens
 - 3.1.2.2.1 Molecular biological procedures
 - 3.1.2.2.2 Major / minor allergens
- 3.1.2.3 Characterization of haptens including drugs
- 3.1.2.4 Allergen distribution
 - 3.1.2.4.1 Geographical differences in allergen distribution
 - 3.1.2.4.2 Influence factors on indoor allergen distribution (furniture, pets / domestic animals, social status)
 - 3.1.2.4.3 Temporal influence on allergen distribution (seasonal vs. perennial respiratory allergens, diurnal variations using the example of pollen)
 - 3.1.2.4.4 Quantification of allergens

3.1.3 Principles of allergological diagnostics (B, c,d,x,l,p)

- 3.1.3.1 Allergological history (family history, personal history)
 - 3.1.3.1.1 Environmental factors
 - 3.1.3.1.2 Severity, temporal and local occurrence of symptoms
 - 3.1.3.1.3 Symptom diary
 - 3.1.3.1.4 Standardized anamnesis questionnaires
- 3.1.3.2 Differential diagnosis in suspected allergic disorders
 - 3.1.3.2.1 Skin disorders
 - 3.1.3.2.2 Disorders of the upper respiratory tract
 - 3.1.3.2.3 Lung diseases
 - 3.1.3.2.4 Gastrointestinal diseases
 - 3.1.3.2.5 Functional disorders
- 3.1.3.3 Clinical examination
 - 3.1.3.3.1 Clinical status (skin, eyes, nose, lung, lymph nodes, internal organs)
- 3.1.3.4 Skin tests
 - 3.1.3.4.1 Prick tests, prick-to-prick test, intradermal test, scarification test
 - 3.1.3.4.2 Epicutaneous / patch test
 - 3.1.3.4.3 Atopy patch test (respiratory allergens, food allergens)
 - 3.1.3.4.4 Diagnostic sensitivity, specificity, negative (NPV) and positive predictive value (PPV) of skin tests

- 3.1.3.4.5 Risks of skin tests
- 3.1.3.5 Provocation tests
 - 3.1.3.5.1 Open, single-blinded, double-blinded, double-blinded placebo-controlled procedures
 - 3.1.3.5.2 Indications, contraindications, performance of oral, nasal, bronchial, conjunctival, cutaneous, subcutaneous and intravenous provocation tests
 - 3.1.3.5.3 Diagnostic validity of provocation tests
 - 3.1.3.5.4 Risks of provocation tests
- 3.1.3.6 Function tests
 - 3.1.3.6.1 Lung function (spirometry)
 - 3.1.3.6.2 Inflammatory measurement (NOx)
 - 3.1.3.6.3 Principles of methacholine test
 - 3.1.3.6.4 Principles of rhinomanometry
 - 3.1.3.6.5 Principles of physical skin tests (dermographism, cold test etc.)
- 3.1.3.7 Special examination techniques (C, I, p)
 - 3.1.3.7.1 Schirmer's test
 - 3.1.3.7.2 Skin biopsy
 - 3.1.3.7.3 Mucosal biopsy
 - 3.1.3.7.4 Anterior rhinoscopy
 - 3.1.3.7.5 Flexible rhinoscopy (without instrumental channel)
 - 3.1.3.7.6 Capillary microscopy
 - 3.1.3.7.7 Sialometry
- 3.1.3.8 In vitro diagnostics
 - 3.1.3.8.1 Total IgE (PRIST)
 - 3.1.3.8.2 Specific IgE (e.g. RAST/UNICap, ISAC)
 - 3.1.3.8.2.1 Techniques
 - 3.1.3.8.2.2 Recombinant and natural allergens
 - 3.1.3.8.3 RAST inhibition tests
 - 3.1.3.8.4 Basophile activation / stimulation tests
 - 3.1.3.8.4.1 Sulfido-leukotriene test, histamine liberation test
 - 3.1.3.8.4.2 Flowcytometry
 - 3.1.3.8.5 Lymphocyte transformation / proliferation test (LTT/LPT)
 - 3.1.3.8.6 Complement measurement
 - 3.1.3.8.7 Secretory molecules of eosinophils (ECP, EPX), mast cells (mast cell tryptase, histamine) and cytokines (cytokine receptors)
 - 3.1.3.8.8 Interpretation of In vitro test procedures
 - 3.1.3.8.8.1 Sensitivity and specificity
 - 3.1.3.8.8.2 Positive and negative predictive value
 - 3.1.3.8.8.3 Pre- and post-test probability

3.1.4 Principles of allergological-immunological therapy (B, m,c,t,e)

- 3.1.4.1 Allergen reduction, elimination and abstention
- 3.1.4.2 Allergen-specific immunotherapy (SIT)
 - 3.1.4.2.1 Subcutaneous immunotherapy (SCIT): pre-seasonal and perennial procedures
 - 3.1.4.2.2 Sublingual immunotherapy (SLIT)

- 3.1.4.2.3 Experimental forms: intralymphatic immunotherapy (ILIT), epidermal application (EPIT)
- 3.1.4.2.4 Extracts: composition, units
- 3.1.4.3 Pharmacotherapy: important pharmaceutical agents/groups
- 3.1.4.4 Systemic vs. local therapy
- 3.1.4.5 Xenobiotic medication
 - 3.1.4.5.1 Cromones (cromoglycate acid and nedocromil), antihistamines (1st and 2nd generation), glucocorticoids, β 2 mimetics, leukotriene antagonists, adrenaline
- 3.1.4.6 Biologicals: e.g. Omalizumab, Rituximab, TNF alpha antagonists
- 3.1.4.7 Immunosuppressive drugs: e.g. Cyclosporine, Azathioprine, Cyclophosphamide
- 3.1.4.8 Specific receptor antagonists: e.g. Icatibant
- 3.1.4.9 Immunoglobulins (IVIG)
- 3.1.4.10 Vaccines and vaccinations

3.2 Allergic disorders of the immediate type

3.2.1 Anaphylaxis (B, c,d,x,l,p,m,t,e)

- 3.2.1.1 Clinical symptoms
 - 3.2.1.1.1 Classification and severity grades
 - 3.2.1.1.2 Exercise-induced (EIA) and food dependent exercise-induced anaphylaxis (FDEIA), summation anaphylaxis
 - 3.2.1.1.3 Contributing factors (cofactors)
- 3.2.1.2 Age distribution and natural course
- 3.2.1.3 Causes of anaphylactic reactions
 - 3.2.1.3.1 Foods, drugs/medications, insect venoms, occupational substances, latex, physical triggers
- 3.2.1.4 Emergency therapy and emergency medication (adrenaline autoinjectors)
- 3.2.1.5 Basic principles of reanimation
- 3.2.1.6 Complications
- 3.2.1.7 Therapy

3.2.2 Allergic rhinitis (B, c,d,x,l,p,m,t,e)

- 3.2.2.1 Clinical symptomatic
 - 3.2.2.1.1 Acute, intermittent, persistent rhinitis
 - 3.2.2.1.2 Polyposis nasi et sinus
 - 3.2.2.1.3 Rhinosinusitis
- 3.2.2.2 Differential diagnosis
- 3.2.2.3 Age distribution and natural course
- 3.2.2.4 Complications
- 3.2.2.5 Therapy

3.2.3 Allergic conjunctivitis (B, c,d,x,l,p,m,t,e)

- 3.2.3.1 Clinical symptomatic
 - 3.2.3.1.1 Atopic ceratoconjunctivitis (atopic cataract)
 - 3.2.3.1.2 Vernal ceratoconjunctivitis
 - 3.2.3.1.3 Papillomatous hyperplastic conjunctivitis in contact lens wearers

- 3.2.3.2 Differential diagnosis
- 3.2.3.3 Age distribution and natural course
- 3.2.3.4 Complications
- 3.2.3.5 Therapy

3.2.4 Bronchial asthma (B, c,d,x,l,p,m,t,e)

- 3.2.4.1 Clinical symptomatic
- 3.2.4.2 Age distribution and natural course
- 3.2.4.3 Forms of asthma (phenotypes):
 - 3.2.4.3.1 Allergic asthma (extrinsic)
 - 3.2.4.3.2 Physical and chemical triggers
 - 3.2.4.3.3 Non-allergic asthma (intrinsic)
 - 3.2.4.3.3.1 Aspirin exacerbated respiratory disease (AERDS, Widal Trias, Samter Trias)
 - 3.2.4.3.4 Asthma in pregnancy
 - 3.2.4.3.5 Occupational asthma
 - 3.2.4.3.5.1 Allergic forms
 - 3.2.4.3.5.2 Non-allergic forms
- 3.2.4.4 Diagnostics
- 3.2.4.5 Complications
- 3.2.4.6 Therapy and prophylaxis
 - 3.2.4.6.1 Patient training
 - 3.2.4.6.2 Occupational consequences (occupational medicine)

3.2.5 Acute and chronic urticaria (B, c,d,x,l,p,m,t,e)

- 3.2.5.1 Clinical symptomatic
 - 3.2.5.1.1 Diagnostics
 - 3.2.5.1.2 Causes (infection-associated, autoimmune, allergens and pseudoallergens)
- 3.2.5.2 Age distribution and natural course
- 3.2.5.3 Chronic spontaneous urticaria (idiopathic forms)
- 3.2.5.4 Inducible urticarias (physical forms)
 - 3.2.5.4.1 Urticarial dermographism (Urticaria factitia, inducible urticaria)
 - 3.2.5.4.2 Cold urticaria
 - 3.2.5.4.3 Cholinergic urticaria
 - 3.2.5.4.4 Pressure urticaria
 - 3.2.5.4.4.1 Delayed type pressure urticaria
 - 3.2.5.4.5 Exercise-induced urticaria
 - 3.2.5.4.6 Rare forms of physical / inducible urticaria (e.g. aquagenic urticaria, solar urticaria)
- 3.2.5.5 Diagnostics
- 3.2.5.6 Complications
- 3.2.5.7 Therapy

3.2.6 Angioedema (Quincke's edema) (B, c,d,x,l,p,m,t,e)

- 3.2.6.1 Clinical symptomatic
 - 3.2.6.1.1 Common localizations
 - 3.2.6.1.2 Hereditary angioedema (types I-III)
 - 3.2.6.1.3 Acquired angioedema
- 3.2.6.2 Age distribution and natural course
- 3.2.6.3 Diagnostics
- 3.2.6.4 Complications
- 3.2.6.5 Therapy

3.2.7 Mastocytosis (B, c,d,x,l,p,m,t,e)

- 3.2.7.1 Clinical symptomatic
- 3.2.7.2 Age distribution and natural course
 - 3.2.7.2.1 Mastocytoma; mastocytosis: cutaneous, systemic (occult)
 - 3.2.7.2.2 Mast cell activation syndrome
 - 3.2.7.2.3 Mastocytosis in association with hematological disorders
- 3.2.7.3 Diagnostics (tryptase, skin biopsy)
- 3.2.7.4 Complications
- 3.2.7.5 Therapy

3.2.8 Food intolerances and gastrointestinal disorders (B, c,d,x,l,p,m,t,e)

- 3.2.8.1 IgE-mediated food allergies including oral allergy syndrome
 - 3.2.8.1.1 Cross-reactivities
- 3.2.8.2 Eosinophilic gastroenteritis and esophagitis
- 3.2.8.3 Non-IgE-mediated food intolerances
 - 3.2.8.3.1 Gluten-sensitive enteropathy (celiac disorder)
 - 3.2.8.3.2 Intolerances (additives, histamine intolerance, fructose malabsorption)
 - 3.2.8.3.3 Enzymopathies
 - 3.2.8.3.3.1 Lactose intolerance
 - 3.2.8.3.4 Intoxications
 - 3.2.8.3.5 Food protein-induced enteritis/proctocolitis
- 3.2.8.4 Age distribution and natural course
 - 3.2.8.4.1 Particularities in childhood
 - 3.2.8.4.2 Particularities in adulthood
- 3.2.8.5 Diagnostics
- 3.2.8.6 Complications
- 3.2.8.7 Therapy
 - 3.2.8.7.1 Elimination diet
 - 3.2.8.7.2 Emergency medication

3.2.9 Drug hypersensitivity reactions (B, c,d,x,l,p,m,t,e)

- 3.2.9.1 Types of hypersensitivity reactions to medications and drugs
 - 3.2.9.1.1 Immediate-type reactions (type I)
 - 3.2.9.1.1.1 Angioedema, urticaria, anaphylaxis
 - 3.2.9.1.2 Cytotoxic reactions (type II)
 - 3.2.9.1.2.1 Cytopenias
 - 3.2.9.1.3 Immune complex-mediated reactions (type III)
 - 3.2.9.1.3.1 Serum sickness disease

- 3.2.9.1.3.2 Immune complex anaphylaxis
- 3.2.9.1.4 Delayed, cellular-mediated reactions (type IV)
 - 3.2.9.1.4.1 Uncomplicated exanthemas as common manifestation
 - 3.2.9.1.4.1.1 Clinical variants of drug-induced exanthemas
 - 3.2.9.1.4.1.2 Immunology of drug-induced exanthemas
 - 3.2.9.1.4.1.3 Common triggers of drug-induced exanthemas
 - 3.2.9.1.4.1.4 Diagnosis and differential diagnosis
 - 3.2.9.1.4.2 Complex exanthemas
 - 3.2.9.1.4.2.1 Severe cutaneous adverse reactions (SCAR)
 - 3.2.9.1.4.2.1.1 Toxic epidermal necrolysis (TEN, Lyell syndrome) and Stevens Johnson syndrome (SJS), Erythema exsudativum major as severe or potentially lethal drug hypersensitivity reactions
 - 3.2.9.1.4.2.1.2 Clinical course
 - 3.2.9.1.4.2.1.3 Common triggers of TEN and SJS
 - 3.2.9.1.4.2.1.4 Therapy
 - 3.2.9.1.4.2.1.5 Prognosis
 - 3.2.9.1.4.2.1.6 AGEP (Acute generalized exanthematous pustulosis)
- 3.2.9.1.5 DRESS (drug reaction with eosinophilia and systemic symptoms)
- 3.2.9.1.6 Pseudo-allergic drug reactions
- 3.2.9.1.7 Intolerance reactions
- 3.2.9.1.8 Infusion reactions
- 3.2.9.2 System and organ involvement
 - 3.2.9.2.1 Drug fever, hepatitis, nephritis, pneumonitis
- 3.2.9.3 Clinical course
- 3.2.9.4 Most frequent involved medications and drugs
 - 3.2.9.4.1 β -lactam antibiotics
 - 3.2.9.4.2 Sulfonamides; para-substituted substances
 - 3.2.9.4.3 Other antibiotics
 - 3.2.9.4.4 Antiepileptic drugs/anticonvulsants
 - 3.2.9.4.5 Local anesthetics
 - 3.2.9.4.6 Analgetic and non-steroidal anti-inflammatory drugs
 - 3.2.9.4.7 Contrast media
 - 3.2.9.4.8 Perioperative medication
 - 3.2.9.4.9 Vaccines
 - 3.2.9.4.10 Biologics
- 3.2.9.5 Diagnostics of drug hypersensitivity reactions/pseudo-allergies
- 3.2.9.6 Risk factors for drug hypersensitivity reactions/pseudo-allergies
 - 3.2.9.6.1 Pharmacogenetic factors
- 3.2.9.7 Prognosis
- 3.2.9.8 Therapy
 - 3.2.9.8.1 Acute phase
 - 3.2.9.8.2 Tolerance induction (desensitization)
 - 3.2.9.8.2.1 Antibiotics (e.g. penicillin)
 - 3.2.9.8.2.2 NSAID (e.g. acetylsalicylic acid)
 - 3.2.9.8.2.3 Cytostatics (e.g. cisplatin)

3.2.10 Insect sting allergy (B, c,d,x,l,p,m,t,e)

- 3.2.10.1 Clinical manifestations
 - 3.2.10.1.1 Allergic versus toxic reactions
 - 3.2.10.1.2 Severity grades (H.L. Mueller, Ring & Messmer)
- 3.2.10.2 Elicitors
 - 3.2.10.2.1 Apidae (honey bees, bumblebees)
 - 3.2.10.2.2 Vespidae (wasps, hornets)
 - 3.2.10.2.3 Formicidae (fire ants, ants)
 - 3.2.10.2.4 Mosquitos and horse-flies, spiders
- 3.2.10.3 Diagnostics
- 3.2.10.4 Complications
- 3.2.10.5 Therapy
 - 3.2.10.5.1 Emergency medication
 - 3.2.10.5.2 Immunotherapy protocols (standard, rush, ultra-rush)

3.2.11 Cytotoxic reactions (A, c,g,p,t)

- 3.2.11.1 Allergic hemolytic anemia
 - 3.2.11.1.1 Immunological mechanisms of hemolysis
 - 3.2.11.1.2 Types of antibodies
 - 3.2.11.1.3 Clinical manifestation of allergic hemolytic anemia
 - 3.2.11.1.4 Diagnostics of hemolytic anemia (Coombs test)
 - 3.2.11.1.5 Other triggers of hemolytic anemia (pregnancy, lymphoma, collagenoses, infections etc.)
 - 3.2.11.1.6 Therapy
- 3.2.11.2 Allergic neutropenia, agranulocytosis
- 3.2.11.3 Allergic thrombocytopenia

3.2.12 Immune complex reactions (A, c,g,l,p,t)

- 3.2.12.1 Triggers, frequency and pathophysiology
- 3.2.12.2 Therapeutic interventions
- 3.2.12.3 Diagnostics
- 3.2.12.4 Clinical manifestation
 - 3.2.12.4.1 Immune complex anaphylaxis
 - 3.2.12.4.2 Serum sickness disease
 - 3.2.12.4.3 Arthus phenomenon

3.2.13 Eczema/dermatitis and photo-induced allergies (B, c,d,x,l,p,m,t)

- 3.2.13.1 Allergic and irritant contact dermatitis, special forms (systemic contact dermatitis) and differential diagnosis
 - 3.2.13.1.1 Contact allergens: haptens, full antigens, cross-reactivity, group reactivity
 - 3.2.13.1.1.1 Influence of lifestyle habits and environmental factors
 - 3.2.13.1.1.2 Age distribution and natural course
 - 3.2.13.1.1.3 Histology
 - 3.2.13.1.2 Most common contact allergens (European standard series)
 - 3.2.13.1.3 Occupational allergens in selected groups: e.g. medical, technical professions
 - 3.2.13.1.4 Diagnostics (epicutaneous/patch test)
 - 3.2.13.1.5 Complications of allergic contact eczemas and prognosis

- 3.2.13.1.6 Prevention and therapy
- 3.2.13.2 Atopic dermatitis (atopic eczema, neurodermitis)
 - 3.2.13.2.1 Frequency, occurrence and pathogenesis
 - 3.2.13.2.1.1 Genetic factors
 - 3.2.13.2.1.2 Influence of lifestyle habits and environmental factors
 - 3.2.13.2.1.3 Age distribution and natural course
 - 3.2.13.2.2 Age-dependent clinical symptoms
 - 3.2.13.2.3 Criteria of diagnosis and differential diagnosis
 - 3.2.13.2.4 Therapy
 - 3.2.13.2.5 Prevention
 - 3.2.13.2.5.1 Preventive measures, occupational medicine, selection of profession/occupation
 - 3.2.13.2.6 Complications and prognosis
- 3.2.13.3 Photo-allergic reactions (medication/drugs and contact allergens), photo-toxic reactions (C, c,d,x,p,m,t)
 - 3.2.13.3.1 Principle of photo-allergy
 - 3.2.13.3.2 Variations of photo-allergic reactions
 - 3.2.13.3.2.1 Photo-allergic contact dermatitis
 - 3.2.13.3.2.2 Photo-induced drug exanthema
 - 3.2.13.3.3 Clinical aspects of photo-allergy and differential diagnosis
 - 3.2.13.3.4 Diagnostics (including measurement of minimal erythematous dose (MED), minimal photo-toxic dose (MPD), photo-patch test)
 - 3.2.13.3.5 Therapy
 - 3.2.13.3.6 Prognosis

3.2.14 Various aspects in allergology (A, g,p)

- 3.2.14.1 Influence of psychological factors on respiratory organs, skin, gastrointestinal tract
- 3.2.14.2 Handling of allergic disorders
 - 3.2.14.2.1 Allergies and interactions within the family
 - 3.2.14.2.2 Coping strategies in allergic disorders
 - 3.2.14.2.3 Compliance in diagnostics and therapy
 - 3.2.14.2.4 Stigmatization by allergic diseases
 - 3.2.14.2.5 Aggravation and dissimulation of symptoms
 - 3.2.14.2.6 Multiple chemical sensitivity syndrome
 - 3.2.14.2.7 "Sick-building syndrome"
- 3.2.14.3 Dependence of allergic disorders from psychological factors
 - 3.2.14.3.1 Depression
- 3.2.14.4 Psychotherapeutic therapies
 - 3.2.14.4.1 Interdisciplinary group therapies and patient training

3.2.15 Prevention in allergology (B, c,d,x,l,p,m,t)

- 3.2.15.1 Primary prevention
 - 3.2.15.1.1 In vitro and in vivo models for the estimation of sensitization risk for "new" substances
 - 3.2.15.1.2 Allergen avoidance and modification for the prevention of sensitization
 - 3.2.15.1.3 Preventive measures for the prevention of sensitization
- 3.2.15.2 Secondary prevention: reduction of symptoms
 - 3.2.15.2.1 Allergen avoidance

- 3.2.15.2.2 Other approaches
- 3.2.15.3 Tertiary prevention: rehabilitation
 - 3.2.15.3.1 Occupational rehabilitation

3.2.16 Occupational allergic diseases (B, c,d,x,p)

- 3.2.16.1 Allergic occupational disorders
 - 3.2.16.1.1 Occupational risk factors for allergic sensitization
 - 3.2.16.1.2 Procedure in suspected occupational disorders
- 3.2.16.2 Common allergic occupational diseases (bakers' asthma, isocyanate asthma, latex allergy)
 - 3.2.16.2.1 Allergic contact dermatitis
- 3.2.16.3 Preventive measures (primary, secondary, tertiary) of occupational diseases
- 3.2.16.4 in employees, by employers, by insurance providers
- 3.2.16.5 Procedure and particularities in expertise questions
- 3.2.16.6 Swiss insurance for occupational diseases and accidents (Suva)
- 3.2.16.7 Criteria for the acknowledgement of an allergy-caused occupational disease of respiratory tract, skin or other organs

4 Clinical Immunology

4.1 Immunodeficiencies

4.1.1 Primary immunodeficiencies (A, c,d,x,l,p,m,t)

- 4.1.1.1 Innate defects of the adaptive immune system
 - 4.1.1.1.1 Congenital agammaglobulinemias
 - 4.1.1.1.2 Congenital dysgammaglobulinemias (selective IgA deficiency, selective IgG subclass deficiencies)
 - 4.1.1.1.2.1 Humoral immunodeficiency with increased IgM
 - 4.1.1.1.2.2 Transitory hypogammaglobulinemia of the newborn
 - 4.1.1.1.2.3 Variable immunodeficiency (common variable immunodeficiency, CVID)
 - 4.1.1.1.2.4 Hypogammaglobulinemias associated with thymoma
- 4.1.1.2 Cellular immunodeficiencies
 - 4.1.1.2.1 Severe combined immunodeficiency (SCID)
 - 4.1.1.2.2 Combined immunodeficiency (CID)
- 4.1.1.3 Complex defects with malformations and systemic symptoms (Di George syndrome, Ataxia teleangiectatica (Louis-Bar syndrome), Wiskott-Aldrich syndrome, hyper-IgE syndrome (Job's or Buckley syndrome))
 - 4.1.1.3.1 Chronic mucocutaneous candidiasis (CMC)
 - 4.1.1.3.2 Primary intestinal lymphangiectasia
- 4.1.1.4 Defects of phagocyte function
 - 4.1.1.4.1 Infantile septic granulomatosis (chronic granulomatous disorder, CGD)
 - 4.1.1.4.2 Chediak-Higashi syndrome
 - 4.1.1.4.3 Congenital leukocyte adhesion deficiency (LAD)
- 4.1.1.5 Complement defects including hereditary angioedema (HAE) types I, II and III
 - 4.1.1.5.1 Isolated defects of single complement components

4.1.2 Non-HIV associated secondary immunodeficiencies (C, g, c)

- 4.1.2.1 Viral infections (measles, rubella, herpes virus group)
- 4.1.2.2 Bacterial infections
- 4.1.2.3 Parasitic infections
- 4.1.2.4 Malnutrition (protein, vitamin, mineral and trace element deficiencies)
 - 4.1.2.4.1 Malignant disorders (e.g. lymphoreticular disorders such as Morbus Hodgkin, plasmacytoma, acute and chronic leukemias)
 - 4.1.2.4.2 Drug- and radiation-induced immunosuppression
 - 4.1.2.4.3 Polytrauma, severe burns and surgery, protein-losing enteropathy
 - 4.1.2.4.3.1 Nephrotic syndrome
 - 4.1.2.4.4 Metabolic disorders (Diabetes mellitus, Cushing's disease)
 - 4.1.2.4.5 In the context of transplantations (bone marrow or hematopoietic stem cell transplantation, solid organ transplantation, cellular transplantation, e.g. pancreatic islet cell transplantation)
 - 4.1.2.4.6 Miscellaneous (uremia, splenectomy, connate sarcoidosis, old age, severe stress)

4.1.3 Secondary immunodeficiency by HIV (AIDS) (C, g, c, I)

- 4.1.3.1 Definition, occurrence and pathogenesis
 - 4.1.3.1.1 Viral transmission and distribution
 - 4.1.3.1.2 Changes in cellular immunity
 - 4.1.3.1.2.1 Functional disturbances of CD4+ T cells
 - 4.1.3.1.3 Changes in humoral immunity
 - 4.1.3.1.3.1 Autoimmunological aspects of HIV infections
 - 4.1.3.1.4 Chronic immune activation and development of immunodeficiency
- 4.1.3.2 Disease course (acute phase, latent phase, AIDS-related complex)
 - 4.1.3.2.1 Classification (categories A-C according to CDC)
 - 4.1.3.2.2 Diagnosis of HIV infection
- 4.1.3.3 Therapy of HIV infection
- 4.1.3.4 HIV exposure in medical context
 - 4.1.3.4.1 Post exposure prophylaxis

4.2 Collagenoses (A, c,d,x,l,p,m,t)

4.2.1 Systemic lupus erythematosus (A, c,d,x,l,p,m,t)

- 4.2.1.1 Definition, occurrence and pathogenesis
 - 4.2.1.1.1 Gender specific influences
 - 4.2.1.1.2 Immunoglobulin classes and subclasses
 - 4.2.1.1.3 Antinuclear antibodies
 - 4.2.1.1.4 Immune complexes
- 4.2.1.2 Clinical manifestations
- 4.2.1.3 Diagnostics and rating of activity
- 4.2.1.4 Therapy
 - 4.2.1.4.1 Therapy of lupus crisis
 - 4.2.1.4.2 ANA negative lupus erythematosus
 - 4.2.1.4.3 Systemic lupus erythematosus (SLE) and pregnancy
- 4.2.1.5 Prognosis and long-term course

4.2.2 Overlap syndromes (A, c,d,x,p,m,t)

- 4.2.2.1 Definition
- 4.2.2.2 Mixed connective tissue disease (MCTD)
- 4.2.2.3 Antisynthetase syndrome (e.g. Jo-1 syndrome)
- 4.2.2.4 Polymyositis-scleroderma (PM/Scl) overlap syndrome

4.2.3 Sjögren's syndrome (A, c,d,x,p,m,t)

- 4.2.3.1 Definition, occurrence and pathogenesis
- 4.2.3.2 Clinical manifestation and diagnostics
- 4.2.3.3 Therapy, evolution and prognosis

4.2.4 Progressive systemic sclerosis (A, c,d,x,p,m,t)

- 4.2.4.1 Definition, occurrence and pathogenesis
- 4.2.4.2 Clinical manifestation
 - 4.2.4.2.1 Localized scleroderma

- 4.2.4.2.2 Progressive systemic scleroderma
- 4.2.4.2.3 Particular forms (eosinophilic fasciitis, acral form (so-called CREST syndrome))

- 4.2.4.3 Therapy
- 4.2.4.4 Evolution and prognosis

4.2.5 Inflammatory myopathies (polymyositis, dermatomyositis, inclusion body myositis) (A, c,d,x,p,m,t)

- 4.2.5.1 Definition, occurrence and pathogenesis
- 4.2.5.2 Clinical manifestation
 - 4.2.5.2.1 Common clinical cardinal symptoms
 - 4.2.5.2.2 Involvement of other organs
 - 4.2.5.2.3 Paraneoplastic syndrome
- 4.2.5.3 Diagnostics
- 4.2.5.4 Therapy
- 4.2.5.5 Evolution and prognosis

4.2.6 Relapsing polychondritis (A, c,d,x,p,m,t)

- 4.2.6.1 Definition, occurrence and pathogenesis
- 4.2.6.2 Clinical manifestation
- 4.2.6.3 Diagnostics
- 4.2.6.4 Therapy

4.2.7 Antiphospholipid syndrome (A, c,d,x,p,m,t)

- 4.2.7.1 Definition, occurrence and pathogenesis
- 4.2.7.2 Clinical manifestation
- 4.2.7.3 Diagnostics
- 4.2.7.4 Therapy

4.3 Vasculitides (A, c,d,x,p,m,t)

4.3.1 Primary vasculitides

- 4.3.1.1 Definition, occurrence and pathogenesis
- 4.3.1.2 Large vessel vasculitis
 - 4.3.1.2.1 Giant cell arteritis/Takayasu's arteritis/polymyalgia rheumatica
 - 4.3.1.2.2 Chronic periaortitis/retroperitoneal fibrosis
- 4.3.1.3 Medium-sized vessel vasculitis
 - 4.3.1.3.1 Kawasaki syndrome
 - 4.3.1.3.2 Polyarteritis nodosa
- 4.3.1.4 Small vessel vasculitis
 - 4.3.1.4.1 ANCA-associated vasculitides: Granulomatosis with ANCA-associated polyangiitis (Morbus Wegener), eosinophilic granulomatosis with ANCA-associated polyangiitis (Churg-Strauss), microscopic ANCA-associated polyangiitis

- 4.3.1.4.2 Immune complex-induced vasculitides: IgA vasculitis (Henoch-Schönlein purpura), anti-glomerular basal membrane disease (Goodpasture syndrome), cryoglobulin vasculitis, urticarial vasculitis
- 4.3.1.4.3 Special forms of vasculitis: Behçet's disease, Sneddon's syndrome, Cogan syndrome, cerebral angiitis, thromboangiitis obliterans)

4.3.2 Secondary vasculitides (A, c,d,x,p,m,t)

- 4.3.2.1 Definition, occurrence and frequency
 - 4.3.2.1.1 Symptoms
 - 4.3.2.1.2 Laboratory analysis
 - 4.3.2.1.3 Therapy
- 4.3.2.2 HCV- and HBV-associated mixed cryoglobulinemia
- 4.3.2.3 Infect-associated forms of vasculitis
- 4.3.2.4 Drug-induced
- 4.3.2.5 Paraneoplastic
- 4.3.2.6 Pyoderma gangrenosum
- 4.3.2.7 Schnitzler syndrome

4.4 Granulomatoses (A, c,d,x,p,m,t,e)

- 4.4.1 Sarcoidosis and other granulomatous diseases (sarcoid-like lesions in CVID)
- 4.4.2 Histiocytoses (Langerhans, non-Langerhans: Erdheim-Chester, Rosai-Dorfman)
- 4.4.3 Castleman's disease
- 4.4.4 Kikuchi-Fujimoto disease

4.5 Autoinflammatory disorders

- 4.5.1 **Familial Mediterranean fever (FMF), cryopyrin-associated periodic syndrome (CAPS): familial cold-associated autoinflammatory syndrome (cold urticaria), Muckle-Wells syndrome, chronic infantile neuro-cutaneous arthritis syndrome (CINCA)), hyper IgD, TRAPS, rare periodic syndromes (PAPA, Blau syndrome, periodic fever, aphthous stomatitis, pharyngitis and adenitis (PFAPA))**
- 4.5.2 **Morbus Behçet**
- 4.5.3 **Morbus Still**
- 4.5.4 **Macrophage activation syndrome; hemophagocytic lymphohistiocytosis (HLH)**

4.6 Eosinophilia and eosinophile-associated disorders (A, c,d,x,p,m,t,e)

4.6.1 Atopy

4.6.2 Drug hypersensitivity (e.g. pulmonary eosinophilia)

4.6.3 Infections (parasites, e.g. helminths), fungal infections (aspergillosis, coccidiosis))

4.6.4 Hematological and neoplastic syndrome (hypereosinophilic syndrome)

4.6.5 Mastocytoses

4.7 Disorders with specific organ involvement (C, c,d,x,p,m,t)

4.7.1 Skin and mucosa (episodic angioedema with eosinophilia, Kimura's disease eosinophilic fasciitis (Shulman's syndrome), Wells' syndrome)

4.7.2 Lung (drug-induced eosinophilic lung diseases, mycotic and parasitic, Löffler's syndrome, tropical eosinophilia, allergic bronchopulmonary mycoses (acute eosinophilic pneumonia, allergic bronchopulmonary aspergillosis, ABPA), chronic eosinophilic pneumonia, granulomatosis with polyangiitis (e.g. Churg-Strauss syndrome), eosinophilic granuloma)

4.7.3 Gastrointestinal tract (eosinophilic esophagitis, gastritis, enteritis, colitis)

4.7.4 Rheumatological disorders (eosinophilia-myalgia/toxic oil syndrome)

4.8 Organ-specific autoimmunopathies (C, c,d,x,p,m,t)

4.8.1 Autoimmune endocrinopathy (C, c,d,x,p,g)

4.8.1.1 Immune thyreopathies

4.8.1.1.1 Definition and occurrence

4.8.1.1.2 Pathogenesis (cellular and humoral autoimmune reactivity)

4.8.1.1.3 Clinical manifestations (hyperplastic, atrophic thyreoiditis; Morbus Basedow, autoimmune (endocrine) orbitopathy)

4.8.1.1.4 Therapy

4.8.1.2 Diabetes mellitus

4.8.1.2.1 Definition and occurrence

4.8.1.2.2 Pathogenesis (cellular and humoral immune reactions)

4.8.1.2.3 Clinical manifestation

4.8.1.2.4 Therapy

- 4.8.1.3 Morbus Addison
 - 4.8.1.3.1 Definition and occurrence
 - 4.8.1.3.2 Pathogenesis
 - 4.8.1.3.3 Diagnostics and differential diagnosis
 - 4.8.1.3.4 Therapy and prognosis
- 4.8.1.4 Autoimmune polyendocrinopathies (polyglandular autoimmune syndrome)

4.8.2 Autoimmune diseases of the liver (C, c,d,x,p,g)

- 4.8.2.1 Autoimmune hepatitis
- 4.8.2.2 Definition and occurrence
- 4.8.2.3 Pathogenesis and autoimmune courses of chronic active hepatitis
- 4.8.2.4 Clinics and diagnostics
- 4.8.2.5 Therapy
- 4.8.2.6 Evolution, complications, prognosis
- 4.8.2.7 Primary biliary cirrhosis/chronic destructive cholangitis
- 4.8.2.8 Definition and occurrence
- 4.8.2.9 Pathogenesis
- 4.8.2.10 Diagnostics and differential diagnostics
- 4.8.2.11 Evolution, complications, prognosis

4.8.3 Autoimmune diseases of the skin (C, c,d,x,p,g,t)

- 4.8.3.1 Autoimmune bullous dermatoses (pemphigus, bullous pemphigoid, cicatricial pemphigoid, gestational pemphigoid, Epidermolysis bullosa acquisita, Dermatitis herpetiformis, linear IgA-dermatosis, intraepidermal IgA-pustulosis, overlap syndrome)
- 4.8.3.2 Lupus erythematosus (chronic cutaneous Lupus erythematosus, subacute cutaneous Lupus erythematosus)

4.8.4 Autoimmune diseases of the kidney (C, c,d,x,p,g)

- 4.8.4.1 Glomerular diseases
 - 4.8.4.1.1 Pathogenesis (Anti-glomerular basement membrane antibody (anti-GBM), activation of the complement cascade: C5b-9 membrane attack complex, circulating inflammation cells, glomerular damage by mesangium cells)
 - 4.8.4.1.2 Clinical manifestations (glomerulonephritis (GN) with minimal change disease, focal segmental glomerulosclerosis, membranous GN, membranoproliferative GN, IgA-nephropathy, lupus nephritis, rapidly progressive GN)
 - 4.8.4.1.3 Diagnostics

4.8.5 Autoimmune diseases of the heart (C, c,d,x,p,g)

- 4.8.5.1 Frequency of cardiomyopathies and myocarditides
- 4.8.5.2 Clinical manifestations
 - 4.8.5.2.1 Myocarditides (postpericardiotomy syndrome (PPS) and Dressler's syndrome, systemic lupus erythematosus (Libman-Sacks endocarditis))
 - 4.8.5.2.2 Therapy

4.8.6 Pericarditis: idiopathic, postinfectious, collagenoses

4.8.7 Autoimmune diseases of the gastrointestinal tract (C, c,d,x,p,g,t)

- 4.8.7.1 Frequency and occurrence
- 4.8.7.2 Diagnostics
- 4.8.7.3 Clinical manifestations (chronic inflammatory gastric diseases, gluten-sensitive enteropathy)
 - 4.8.7.3.1 Other disorders (chronic atrophic gastritis type A and pernicious anemia, Helicobacter-induced lymphoma, Morbus Behçet, collagenous colitis, microscopic colitis)

4.8.8 Amyloidosis (C, c,d,x,p,g,t)

- 4.8.8.1 Definition and occurrence
- 4.8.8.2 Diagnosis (amyloid depositions)
- 4.8.8.3 Classification and symptomatology
- 4.8.8.4 Clinical manifestations
- 4.8.8.5 Therapy and prognosis

4.8.9 Autoimmune diseases of the eye/orbit (C, c,d,x,p,g)

- 4.8.9.1 Occurrence and frequency in general and multisystemic diseases in
 - 4.8.9.1.1 Ankylosing spondylitis, Reiter syndrome, rheumatoid arthritis, Sjörger's syndrome,
 - 4.8.9.1.2 Sarcoidosis, immune vasculitides, panarteriitis nodosa, Giant cell disease, granulomatosis with polyangiitis, Behçet's disease, Vogt-Koyanagi-Harada syndrome, Lupus erythematosus, endocrine orbitopathy, ocular myasthenia gravis
 - 4.8.9.1.3 The eye as a target of immunological secondary reactions: tuberculosis, leprosy, lues, brucellosis, histoplasmosis, yersiniosis, borreliosis
- 4.8.9.2 Local immunological diseases of the eye
 - 4.8.9.2.1 Endogenous uveitis (uveitis anterior/iridocyclitis, intermediate uveitis, posterior uveitis, panuveitis)
 - 4.8.9.2.2 Neuritis nervi optici
 - 4.8.9.2.3 Affection of the eye in immune deficiencies (innate, acquired)

4.8.10 Autoimmune diseases of the nervous system (C, c,d,x,p,g)

- 4.8.10.1 Guillain-Barré syndrome and chronically recurrent idiopathic polyneuritis
- 4.8.10.2 Other immune-mediated polyneuropathies
- 4.8.10.3 Peripheral neuropathy with monoclonal gammopathy
- 4.8.10.4 Multifocal motoric neuropathy
- 4.8.10.5 Subacute paraneoplastic neuropathy

4.8.11 Multiple sclerosis (C, c,d,x,p,g)

- 4.8.11.1 Definition and occurrence
- 4.8.11.2 Clinical manifestations
- 4.8.11.3 Diagnostics (liquor, electrodiagnosis, neuroradiology)
- 4.8.11.4 Therapy

4.8.12 Autoimmune neuromuscular disorders (C, c,d,x,p,g)

- 4.8.12.1 Myasthenia gravis
- 4.8.12.2 Lambert-Eaton myasthenic syndrome
- 4.8.12.3 Acquired neuromyotonia

4.9 Transplantation immunology (C, c,d,x,p,g,t)

4.9.1 Bone marrow transplantation

- 4.9.1.1 History
 - 4.9.1.1.1 Origin of hemopoietic stem cells
 - 4.9.1.1.2 Donors
 - 4.9.1.1.3 Indications and contraindications
 - 4.9.1.1.4 Diseases that can be treated by a bone marrow transplantation
 - 4.9.1.1.5 Complications in bone marrow transplantation
 - 4.9.1.1.5.1 Graft-versus-Host disease
 - 4.9.1.1.5.2 Early complications
 - 4.9.1.1.5.3 Late complications
 - 4.9.1.1.6 Results

4.9.2 Transplantation of solid organs

- 4.9.2.1 Patient selection
- 4.9.2.2 Immunosuppression
- 4.9.2.3 Diagnostics of rejection
 - 4.9.2.3.1 Hyperacute rejection
 - 4.9.2.3.2 Acute rejection
 - 4.9.2.3.3 Chronic rejection
- 4.9.2.4 Complications
- 4.9.2.5 Results and quality of life after transplantations