*EAACI-Committee **
for
EAACI-UEMS Examination

Catalogue of topics to be examined in the EAACI-UEMS examination in Allergology/clinical Immunology

Seventh version
2/2021

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Foreword:

The EAACI-UEMS exam is offered regularly by EAACI, and before the COVID-19-pandemia, it was held in person, during the annual EAACI Congress. In 2021 the 13th Exam will be, for the first time, organized online.

The EAACI/UEMS Exam consists of one hundred and twenty challenging single and multiple-choice questions, which test the candidates' theoretical insights and clinical judgment. Knowledge is evaluated by using both "single one-best-answer item" (type A) or "quadruple decision" (type K) questions formulated in a clear, unambiguous way. Furthermore, type K questions use the Script Concordance Test principle, which allows assessment of the clinical reasoning of the candidate. Clinical aspects are emphasized. We expect that an allergologist/clinical immunologist has once read an immunology textbook and is more familiar with basic immunology than his colleagues devoted to other areas. Therefore, some basic immunology will be part of the examination as well (however, far less than in the board examination in the USA).

It is imperative for us to try to achieve a high standard of allergology and clinical immunology knowledge throughout Europe among our specialty. For this reason, new questions are created every year since 2008, by a Panel of European Experts representing each EAACI WG/ IG/TF, and reviewed by the Exam team. This way a representation of all fields, in a diverse and updated manner, is ensured. The Exam Blueprints cover all areas of allergology, including those important for differential diagnosis (e.g. lactose intolerance, mastocytosis, etc.) often seen by allergologists and some important subjects of clinical immunology. Therefore, about 60-70% of the questions address allergic diseases, 20% are devoted to basic and clinical immunology while 10-20% focus on additional knowledge including allergy diagnosis, allergen taxonomy, and structure.

The EAACI-UEMS exam is based on the UEMS recommendations for teaching allergology and clinical immunology *(Allergy. 2004; 59:579-88*). To facilitate the preparation for the exam we have put together a list of topics for the exam, which are based on the UEMS recommended training program and updated every few years. A list of carefully selected books and articles will be placed on the EAACI-homepage as well.

We hope the Exam will meet your expectations and we are thankful for your contribution to the improvement of the training for the European allergists.

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EAACI_Exam_Blueprint

I Dimension

1. Basic Immunology (comment: 10% of all questions)
2. Allergens – Taxonomy, Structure (comment: 5-10% of all questions)
3. Allergy diagnosis (comment: 5-10% of all questions)
4. Diseases of the skin and mucous membranes (comment: 4-15: 60-70% of all questions)
5 Respiratory diseases
6. Allergic diseases of the eye
7. Drug hypersensitivity reactions
8. Food allergy
9. Anaphylaxis
10. Mast cell disorders
11. Eosinophilic diseases
12. Occupational allergology
13. Compared veterinary allergy
14. Insect venom allergy
15. Other Allergology
16. Clinical immunology (comment: 10% of all questions)

II Dimension

<u>1. Basic Immunology (comment: 10% of all questions)</u>

1.1 Innate and adaptive immunity, including TLR
1.2 Lymphoid organs, cell trafficking
1.3 MHC, HLA-System/immunogenetics; Transplant Immunology
1.4 Antigen-presenting cells Monocytes and Macrophages subtypes
1.5 Lymphocytes and Immunoglobulins
(comment: includes 1.5.1 T lymphocytes, function and subsets, 1.5.2 T-regulatory cells, 1.5.3 B lymphocytes, immunoglobulins, 1.5.4 Monocytes, and Macrophages subtypes)
1.6 Innate immune and effector cells
(comment: includes 1.6.1 Mast cell biology, 1.6.2 Granulocytes: Eosinophils, Basophils, Neutrophils, 1.6.3 ILCs subtypes, 1.6.4 NK-cells, and NK-T cells)
1.7 Epithelial cells
1.8 Soluble mediators
(comment: includes 1.8.1 Inflammatory mediators (histamine, tryptase, leukotrienes, PAF, bradykinin, etc.), 1.8.2 Cytokines, 1.8.3 Adhesion and chemotaxis (ICAMs, VCAM, selectins, etc.), 1.8.4 Complement system)
1.9 Key immune mechanisms
(comment: includes 1.9.1 IgE and the IgE receptor, 1.9.2 Peripheral class switching. IgG responses to allergens, 1.9.3 Local immune response - cutaneous, bronchial, oral/gastrointestinal immune response - AIT/Stem cell role, 1.9.4 Tolerance mechanism – AIT/vaccines, 1.9.5 Immunity against different classes of infectious agents (viral, bacterial, fungal, protozoan), 1.9.6 Autoimmune mechanism, organ-specific and systemic,
1.10 Allergo pharmacology (comment: includes small molecules, vaccines, biologicals, etc.)
1.11 Basics of clinical studies and epidemiologic cohorts

2. Allergens – Taxonomy, Structure (comment: 5-10% of all questions)
2.1 Allergens, haptens, xenobiotics, biologicals (Concept and definitions)
2.2 Indoor and outdoor exposure, aerobiology. Hygiene hypothesis
2.3 Allergen Nomenclature
2.4 Recombinant allergens of plant origin Comment: pan-allergens, CRD see 2.10
2.5 Fungal and animal allergens
2.6 Hymenoptera allergens (includes description of new Hymenoptera allergens/epitopes, geographic distribution of species)
2.7 Relationship of chemical characteristics of individual allergens to symptoms
2.8 Standardization of allergen extracts
2.9 Synthetic epitopes
2.10 Pan-allergens, cross-reactivities. Component-resolved diagnosis (CRD)
2.11 Other

3. Allergy diagnosis (5-10%)
3.1 In vivo
(comment: includes 3.1.1 Indication – contraindication; 3.1.2 Skin tests - prick, scratch, intradermal, patch - epicutaneous - atopy patch test; 3.1.3 Provocation tests - cutaneous - conjunctival - nasal – inhalative – bronchial - Metacholine/ mannitol/bronchial provocation test; oral; blinding, interpretation. Indication, Precautions, Preparations. Cofactor inclusion. Grading, management; 3.1.4 Autologous serum test; Exercise challenge test; Rhinomanometry/Manometry/Oscillometry; Pulmonary functional test; FeNo; Exhale breath condensate; Sputum induction; 3.1.5 BAL; Ergometry - physical tests: pressure, cold, dermographism, UVA/UVB, etc.)
3.2 In vitro
(comment: includes 3.2.1 Indication, sensitivity, specificity; 3.2.2 Specific IgE determinations techniques; 3.2.3 CRD; 3.2.4 Basophil activation tests (flow cytometry) - 3.2.5 Lymphocyte activation (transformation) tests (proliferation, flow cytometry) - 3.2.6 Western blots; ELIspot; Histology)
3.3 Biomarkers

4.-15. Clinical Allergology (comment: 60-70% of all questions)
4.Diseases of the skin and mucous membranes
4.1. Atopic dermatitis
(comment: includes 4.1.1 Definition; 4.1.2 Epidemiology; 4.1.3 Genetics; 4.1.4 Pathogenesis ; 4.1.5 Clinical workup, clinical features; 4.1.6 Diagnostic: criteria, scoring system, phenotypes (In vivo diagnostic - skin tests, provocation (e.g OFC), In vitro diagnostic); 4.1.7 Treatment (Prophylactic/preventive; Symptomatic therapy (effect and side effect); Allergen-specific therapy (effect and side effect); Allergen-unspecific therapy (effect and side effect) immunomodulatory/immunosuppressor/biologicals; Therapy during pregnancy and in children (evaluation of risk))
4.2 Urticaria and histaminergic Angioedema
(Comment: includes: 4.2.1 Definition; 4.2.2 Epidemiology; 4.1.3 Pathogenesis; 4.2.4 Clinical workup-acute vs. chronic/spontaneous vs. inducible, clinical features; 4.2.5 Diagnostic (Scoring system, In vivo diagnostic - skin tests, provocation, In vitro diagnostic); 4.2.6 Treatment (Stepwise (diets); Prophylactic/preventive ; Symptomatic therapy (effect and side

effect) – stepwise; Immunomodulatory/immunosuppressor/biologicals pregnancy (evaluation of risk) and in children));
4.3 Contact dermatitis
(Comment: includes: 4.3.1 Definition; 4.3.2 Epidemiology; 4.3.3 Pathogenesis; 4.3.4 Clinical workup. ICD (irritant contact dermatitis) vs. ACD (allergic contact dermatitis); 4.3.5 Diagnostic: (In vivo - skin tests - patch, photo patch, ROAT (repeated open application test), provocation; In vitro diagnostic); 4.3.6 Treatment (Prophylactic/preventive; Symptomatic therapy (effect and side effect); Immunotherapy; Biologicals: Therapy during pregnancy (evaluation of risk) and in children))
4.4 Non-histaminergic angioedema
(Comment: includes: 4.4.1 Definition; 4.4.2 Epidemiology; 4.4.3 Pathogenesis (Idiopathic non-histaminergic AE, Acquired angioedema related to angiotensin-converting-enzyme inhibitors (ACEI-AAE), Acquired angioedema due to deficiency of C1 esterase inhibitor C1INH-AAE, Hereditary angioedema: with C1qinhibitor esterase deficiency and with normal C1q Inhibitor esterase values with genetic mutations (AAE-FXII/PLM/ANGPT1) and of unknown cause; 4.4.4 Clinical workup; 4.4.5 Diagnostic: In vitro diagnostics, Genetic diagnostic; 4.4.6 Treatment Prophylactic/preventive – precipitant factors, Avoidance, Symptomatic therapy (effect and side effect). Acute treatment, Long term treatment)

5. Respiratory diseases
5.1 Allergic (AR) vs. Non-allergic rhinitis (NAR)
(Comment: includes: 5.1.1 Definition;5.1.2 Epidemiology; 5.1.3 Pathogenesis; 5.1.4 Clinical workup, clinical features; 5.1.5 Diagnostic: criteria, scoring system, phenotypes (In vivo diagnostic - skin tests, nasal provocation tests, rhinomanometry, rhinometry, etc.; In vitro diagnostic – CRD, nasal secretion analysis (cells, cytokines, etc.); 5.1.6 Treatment (Prophylactic/preventive; Symptomatic therapy (effect and side effect); Allergen-specific therapy (effect and side effect) – AR; Allergen-unspecific therapy (effect and side effect) - biologicals; Therapy during pregnancy and in children (evaluation of risk))
5.2 CRSwNP with vs. CRSsNP
(Comment: includes: 5.2.1 Definition; 5.2.2 Epidemiology; 5.2.3 Pathogenesis; 5.2.4 Clinical workup, clinical features 5.2.5 Diagnostic: Criteria, scoring system, phenotypes; In vivo diagnostic - skin tests, provocation; In vitro diagnostic; Imaging); 5.2.6 Treatment (Prophylactic/preventive, Symptomatic therapy (effect and side effect), Allergen-specific therapy (effect and side effect) – AR, Allergen-unspecific therapy (effect and side effect) - biologicals, Therapy during pregnancy and in children (evaluation of risk))
5.3. Asthma
(Comment: includes: 5.3.1 Definition, 5.3.2 Epidemiology, 5.3.3 Pathogenesis phenotypes, 5.3.4 Clinical features, criteria, 5.3.5 Diagnostic: In vivo diagnostic - skin tests, provocation, respiratory functional test, FeNO, In vitro diagnostic, 5.3.6 Treatment: Prophylactic/preventive, Symptomatic therapy (effect and side effect) - Stepwise approach (GINA), Allergen-specific therapy (effect and side effect), Allergen-unspecific therapy (effect and side effect) - biologicals, Therapy during pregnancy and in children (evaluation of risk)/athletes)
5.4 Allergic bronchopulmonary aspergillosis (ABPA)
(Comment: includes: 5.4.1 Definition, 5.4.2 Epidemiology, 5.4.3 Pathogenesis, 5.4.4 Clinical features, criteria, 5.4.5 Diagnostic: In vivo diagnostic - skin tests, respiratory functional test, In vitro diagnostic, Imaging

5.4.6 Treatment: Prophylactic/preventive, Symptomatic therapy (effect and side effect), Allergen-specific therapy (effect and side effect), Allergen-unspecific therapy (effect and side effect) - biologicals, off label medication)

6. Allergic diseases of the eye
6.1 Allergic conjunctivitis
(Comment: includes: 6.1.1 Definition, 6.1.2 Epidemiology, 6.1.3 Pathogenesis, 6.1.4 Clinical workup, clinical features, 6.1.5 Diagnostic: Criteria, scoring system, In vivo diagnostic - skin tests, provocation, In vitro diagnostic, 6.1.6 Treatment: Prophylactic/preventive, Symptomatic therapy (effect and side effect), Allergen-specific therapy (effect and side effect), Allergen-unspecific therapy (effect and side effect) – biologicals, Therapy during pregnancy and in children (evaluation of risk))
6.2 Other conjunctivitis/keratoconjunctivitis
(Comment: includes: 6.2.1 Definition, 6.2.2 Epidemiology, 6.2.3 Pathogenesis, 6.2.4 Clinical workup, clinical features, 6.2.5 Diagnostic: Criteria, scoring system, In vivo diagnostic - skin tests, provocation, In vitro diagnostic, 6.2.6 Treatment: Prophylactic/preventive, Symptomatic therapy (effect and side effect), Allergen-specific therapy (effect and side effect), Allergen-unspecific therapy (effect and side effect) – biologicals, Therapy during pregnancy and in children (evaluation of risk))

7. Drug hypersensitivity reactions
(Comment: includes: 7.1 Definition, 7.2 Classification; Clinical workup, clinical features, 7.3 Pathogenesis, 7.4 Epidemiology, 7.4.1 Risk factors, 7.5 Genetics, 7.6 Diagnostic: Criteria, scoring system, In vivo diagnostic - skin tests, provocation, In vitro diagnostic, Histopathology, 7.7 Treatment: Prophylactic/preventive – avoidance, Symptomatic therapy (effect and side effect) - acute drug reactions, Treating through, Desensitization, Therapy during pregnancy and in children (evaluation of risk))

8. Food allergy excluding eosinophilic gastrointestinal disorders
(Comment: includes: Food allergy, 8.1 Definition, 8.2 Epidemiology, 8.3 Pathogenesis, 8.4 Clinical workup, clinical features, types of food allergy IMMEDIATE vs NON-IMMEDIATE, IgE vs. non-IgE mediated, TYPE I vs. TYPE II, etc., 8.5 Diagnostic: In vivo diagnostic - skin tests, provocation, In vitro diagnostic - including CRD and BAT value, Histology**,** 8.6 Treatment: Prophylactic/preventive, Exclusion diets, Symptomatic therapy (effect and side effect), Allergen-specific therapy (effect and side effect), Allergen-unspecific therapy (effect and side effect) – biologicals, Therapy during pregnancy and in children (evaluation of risk))

9. Anaphylaxis
(Comment: includes: 9.1 Definition, 9.2 Epidemiology, 9.3 Pathogenesis. Causes, Cofactors, 9.4 Clinical workup, clinical features, 9.5 Diagnostic: Classification, Stratification, Grading/Scoring, In vivo diagnostic - skin tests, provocation, In vitro diagnostic - including CRD and BAT value, 9.6 Treatment: Prophylactic/preventive, Exclusion, Symptomatic therapy (effect and side effect). Acute treatment – indications, Allergen-specific therapy (effect and side effect), Therapy during pregnancy and in children (evaluation of risk))

10. Mastocytosis and other mast cell disorders. MCAS, Kounis syndrome

(Comment: includes: 10.1 Definition, 10.2 Epidemiology, 10.3 Pathogenesis, 10.4 Clinical workup, clinical features, 10.5 Diagnostic: Classification, Paraclinical diagnostic, Histology, Criteria for each disease, 10.6 Treatment: Prophylactic/preventive, Exclusion, Symptomatic therapy (effect and side effect). Acute treatment – indications, Allergen-specific therapy (effect and side effect) - e.g venom specific immunotherapy, Biologicals, chemotherapeutics, Therapy during pregnancy and in children (evaluation of risk))

11. Eosinophilic diseases
11.1 Eosinophilic skin disorders: (Comment: includes: 11.1.1 Wells syndrome, 11.1.2 Eosinophilic fasciitis (Shulman syndrome), 11.1.3 Episodic angioedema with eosinophilia (Gleich syndrome)
(Comment: includes for each disease: Definition, Epidemiology, Pathogenesis, Diagnostic: Clinical workup, clinical features, Classification, Scoring system, Paraclinical diagnostic, Imaging, Histology, Criteria for each disease, Treatment: Symptomatic therapy (effect and side effect), Biologicals, chemotherapeutics, immunosuppressive)

11.2 Eosinophilic gastrointestinal disorders
(Comment: includes 11.2.1 Eosinophilic esophagitis (EOE), 11.2.2 Eosinophilic gastroenteritis (EGE), 11.2.3 Eosinophilic colitis (EC))

11.3 Other eosinophilic diseases (Comment: includes 11.3.1 Hypereosinophilic syndrome, 11.3.2 Eosinophilic granulomatosis with polyangiitis (Churg-Strauss syndrome), 11.2.3 Other eosinophilic diseases of the lung: Allergic fungal sinusitis, Acute and chronic eosinophilic lung diseases (Parasitic infections, Fungal and mycobacterial infections, Medication, and toxins, Idiopathic acute eosinophilic pneumonia, Chronic eosinophilic pneumonia, neoplasia)

12. Occupational allergology - Asthma, Rhinitis, Contact dermatitis, Anaphylaxis, Latex hypersensitivity, Animal epithelia hypersensitivity, Occupational hypersensitivity pneumonitis, etc.
(Comment: includes: 12.1 Definition, 12.2 Epidemiology, 12.3 Pathogenesis, 12.4 Clinical workup, clinical features, 12.5 Diagnostic: Criteria, scoring system, In vivo diagnostic - skin tests, provocation, Respiratory functional test, In vitro diagnostic, 12.6 Treatment: Prophylactic/preventive – Safety considerations, Social impact consideration; Occupational reorientation, Symptomatic therapy (effect and side effect), Allergen-specific therapy (effect and side effect), Other)

13. Compared Veterinary allergy
(Comment: includes: Asthma, Rhinitis, Atopic dermatitis in animals – Epidemiology, Diagnostic, Treatment - including AIT, biologicals)

14. Insect venom allergy
(Comment: includes: 14.1 Insect allergy – types, classifications (all insects – saliva, venom), 14.2 Epidemiology, 14.3 Pathogenesis, 14.4 Clinical workup, clinical features, 14.5 Diagnostic: In vivo diagnostic - skin tests, provocation, In vitro diagnostic, 14.6 Treatment: Prophylactic/preventive, Symptomatic therapy (effect and side effect), Allergen-specific therapy (effect and side effect), Venom AIT and mastocytosis)

15. Other Allergology

15.1 Other diseases:
(Comment: includes: Celiac disease, Food intolerance, 6GPD deficiency, Allergo/Immuno-Oncology, Other)

15.2 Controversial diseases:
(Comment: includes: Multiple chemical sensitivity syndrome, Sick building syndrome, Chronic fatigue syndrome, Multiple drug hypersensitivity syndrome, Histamine intolerance/DAO deficiency, Other)

16. Clinical immunology (comment: 10% of all questions)
16.1 Immune deficiencies (primary and secondary)
(Comment: includes: 16.1.1 - Primary immune deficiency like APS-1, IPEX, Wiskott-Aldrich, IgA deficiency, CVID, Immunodeficiencies with high IgE, etc., 16.1.2 Not-HIV-associated secondary immune deficiency, 16.1.3 Main symptoms of HIV induced diseases (AIDS)), each with Diagnostic: Clinical features, Classification, Paraclinical diagnostic, Imaging, Genetics, Criteria for each disease, Treatment: Symptomatic therapy (effect and side effect), intravenous immunoglobulins, other)

16.2 Connective tissue diseases and vasculitis
(Comment: includes:16.2.1 Systemic lupus erythematosus, 16.2.2 Undifferentiated systemic rheumatic (connective tissue) diseases, 16.2.3 Sjörgen syndrome, 16.2.4 Systemic sclerosis (scleroderma), 16.2.5. Polymyositis, Dermatomyositis, Inclusion body myositis, 16.2.6 Antiphospholipid syndrome, 16.2.7 Vasculitis – classification criteria) each with Diagnostic: Clinical features, Classification, Paraclinical diagnostic, Imaging, Criteria for each disease, Assessment of severity, Treatment recommendations)

16.3 Granulomatous diseases
(Comment: includes: 16.3.1 Sarcoidosis, 16.3.2 Wegener`s disease, 16.3.3 Behçet syndrome), each with Diagnostic: Clinical features, Classification, Paraclinical diagnostic, Imaging, Criteria for each disease, Assessment of severity, Treatment recommendations)

16.4 Autoimmune cytopenias
(Comment: includes: 16.4.1 Autoimmune anemia, 16.4.2 Autoimmune thrombocytopenia, 16.4.3 Autoimmune neutropenia), each with Diagnostic: Clinical features, Classification, Paraclinical diagnostic, Genetics, Histopathology, Criteria for each disease, Treatment: Symptomatic therapy (effect and side effect), biologicals, immune suppressors, intravenous immunoglobulins, plasmapheresis, splenectomy, etc.)

16.5 Organ-specific autoimmune diseases
(Comment: includes: 16.5.1 Autoimmune endocrinopathies,16.5.2 Primary biliary cirrhosis, 16.5.3 Autoimmune hepatitis, 16.5.4 Inflammatory bowel diseases, 16.5.5 Glomerulonephritis and Goodpasture syndrome, 16.5.6 Autoimmune skin diseases (pemphigus and pemphigoid), 16.5.7 Rheumatoid arthritis, Diagnostic: Clinical features, Classification, Paraclinical diagnostic, Genetics, Histopathology, Criteria for each disease,

Treatment: Symptomatic therapy (effect and side effect), biologicals, immune suppressors, intravenous immunoglobulins, plasmapheresis, splenectomy, etc).

16.6 Neuro-immunological syndromes
(Comment: includes: 16.6.1 Immunologically induced disturbance of neuromuscular transference (myasthenia gravis, Lambert-Eaton syndrome), 16.6.2 Guillain-Barré syndrome, chronic polyneuritis, and other immunological induced polyneuropathies, 16.6.3 Multiple sclerosis, Diagnostic: Clinical features, Classification, Paraclinical diagnostic, Genetics, Histopathology, Criteria for each disease, Treatment: Symptomatic therapy (effect and side effect), biologicals, immune suppressors, intravenous immunoglobulins, plasmapheresis, splenectomy, etc).

16.7 Recurrent fever syndromes
(Comment: includes: familial Mediterranean fever (FMF), tumor necrosis factor (TNF) receptor-1 associated periodic syndrome (TRAPS), hyper immunoglobulin D syndrome (HIDS), cryopyrin-associated periodic syndromes (CAPS), and Periodic fevers with aphthous stomatitis, pharyngitis, and adenitis (PFAPA))
(Comment: includes: Diagnostic: Clinical features, Classification, Paraclinical diagnostic, Genetics, Histopathology, Criteria for each disease, Treatment: Symptomatic therapy (effect and side effect), biologicals, immune suppressors, intravenous immunoglobulins, plasmapheresis, splenectomy, etc.)

III Dimension
1. Basic exam
2. Pediatric exam

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