Allergy, Immunopathology.

Case 1.

A 10-year-old boy with a leg injury was given antitetanic serum with a prophylactic purpose. On the eighth day after the administration of the serum the child developed severe pains and swelling of the shoulder and knee joints; a generalized rash. He also had fever, acute general weakness, thudding heart sounds and a decreased blood pressure. The child was hospitalized with a diagnosis "serum disease".

1. What type of immune disorder (Gell and Coombs classification) does "serum disease" refer to?
2. Explain the pathogenesis of the disease and its main symptoms.
3. Why did the symptoms develop on the eighth day after the administration of the antitetanic serum?
4. How must the serum be administered in order to prevent the development of anaphylactic shock?

Case 2.

Patient G., 35 years old, a factory worker dealing with nickel-plating of metal articles (he puts metal things into an electrolytic bath and takes them out) applied to his physician with complaints of itching eruptions on the skin of the hands, irritability, sleeping disorders. The eruptions appeared two months ago. He treated himself with *Suprastin* and *Tavegil* (blockers of H_1-receptors) but unsuccessfully.

The examination revealed papular-vesicular rash, scratching marks, hemorrhagic crusts. An application test with nickel sulfate was positive. A macrophage migration inhibition test with a nickel preparation also gave a positive result.

1. What disease can be most likely suspected in this patient? Justify your conclusion.
2. What type of immune disorders does this disease pertain to?
3. Explain the pathogenesis of this disease.
4. What time should pass between the application test with nickel sulfate and the assessment of its result? Why?
5. Explain the inefficiency of treatment with *Suprastin* and *Tavegil.*

Case 3.

A patient applied to his physician with complaints of itching of the eyelids, lacrimation, acute rhinitis, sneezing which have been disturbing him for two years in April and May. His blood test showed large quantities of eosinophils. The patient's father suffers from bronchial asthma.

1. What disease does the patient most likely have?
2. Justify your conclusion.
3. What methods of investigation will help you to confirm your diagnosis?
4. Explain the pathogenesis of the symptoms of the disease.
5. Explain the role of eosinophils in this disease.
6. Is it expedient to administer antigen-specific immunotherapy to this patient?

Case 4.

A patient with atopic bronchial asthma developed an attack of asphyxia after a provocative test with an allergen. The attack was reversed within half an hour. Six hours later a bronchospasm developed again without any contact with the allergen. The X-ray film revealed the presence of an infiltrate in the patient's lungs.

1. What type of allergic reactions does the second bronchospasm pertain to?
2. Describe the mechanism of the first and the second attack of asphyxia.
3. What types of cells predominantly take part in the development of the first and the second attack of asphyxia?

Case 5

Patient M., 32 years old, was admitted to hospital with complaints of marked weakness, dizziness, jaundice of the skin and sclera. Examination revealed a decreased level of hemoglobin and erythrocytes and an increased content of bilirubin in the blood. Coombs test was positive. From the patient's medical history it was known that she had been taking sulfonamide medications for a long time. A diagnosis was made: immune hemolytic anemia.

1. What is the role of sulfonamides in the development of this disease?
2. Explain the pathogenesis of this hemolytic anemia.
3. Can sulfonamides and other medications cause pseudoallergy?
4. What is pseudoallergy?

Case 6.

Before administration of a resolving dose of an anaphylaxis-provoking allergen one sensitized experimental animal was injected a β-adrenoblocker, and the other – a β-adrenostimulator.

1. In which case will the pathochemical stage of the allergic reaction be more expressed and why?

2. What medications should be administered to weaken the anaphylactic reaction?
3. Explain the mechanism of their action.

Case 7.

A child, aged 10, was taken to hospital with an attack of bronchial asthma. From his medical history it is known that attacks of asthma appeared after the family had acquired a dog. After a successful treatment the child was directed to an allergist who carried out diagnostic skin tests. At the site of the contact with the allergen from the dog's fur hyperemia, edema (size 2cm^2) and itching developed which quickly disappeared after this skin area was treated with 1% hydrocortisone ointment.

1. Assess the result of the skin test.
2. What time is necessary for the maximal development of skin reaction to an allergen?
3. Explain the mechanism of the skin reaction.
4. How can the effect of hydrocortisone ointment be explained?
5. What recommendations should be given to the child's parents?

Case 8

Parents and their 5-year-old son visited their friends where the child developed an attack of asphyxia after a contact with a cat. The ambulance was called in, and the doctors stopped the attack and recommended the parents to show their child to an allergist. The child's father has bronchial asthma.

1. What role does hereditary predisposition play in the development of atopic diseases? What stages of allergy pathogenesis can it influence?
2. Explain a possible mechanism of the attack of asphyxia in this child.
3. How does the content of cAMP and Ca^{2+} in mastocytes and smooth muscle cells of the airways change at the moment of the attack?
4. What medications (name the pharmacological groups) can affect the content of cAMP and Ca^{2+} in bronchial asthma?

Case 9.

Patient A., 23 years old, lost consciousness after a bee had stung her in the scalp and was taken to hospital. The patient developed generalized urticaria, face edema, stenotic breathing. Her BP was 70/40 mm Hg, pulse – 120/min.

From the patient's medical history it is known that her mother suffers from urticaria and Quincke's edema, her father is a bee-keeper. The patient had been repeatedly stung by bees with development of severe itching, pain, burning and edema at the site of the sting.

1. What disease does the patient have?
2. Justify your conclusion.
3. According to what type of immune disorder did the disease develop?
4. Explain the pathogenesis of the main symptoms of the disease.

1. Will the contractile reaction of smooth-muscle organs to a specific antigen change on the background of the previous introduction of salbutamol? Justify your answer.

Case 10.

Patient R., 48 years old, a nurse. After 20 years of work in the internal disease department of a hospital she developed symptoms of allergy to penicillin in the form of allergic dermatitis of the hands, face and neck. She fell ill with left-sided pneumonia and was prescribed penicillin injections. 3-5 minutes after the first injection she lost consciousness, her blood pressure dropped sharply and stenotic breathing appeared.

1. What complication developed in this patient after the injection of penicillin?
2. According to what type of immune disorder did it develop?
3. Explain the pathogenesis of the main symptoms of the disease.