Welcome to the FIT Board Review Corner, prepared by Miriam Samstein, MD, PhD, and Timothy Chow, MD, senior and junior representatives of the College’s Fellows-In-Training (FITs) to the Board of Regents. The FIT Board Review Corner is an opportunity to help hone your Board preparedness.

Review Questions
Allergy and Immunology Review Corner: Middleton’s Allergy Principles and Practice, 8th Edition N. Franklin Adkinson Jr., MD, Bruce S Bochner, MD, A Wesley Burks, MD, William W Busse, MD, Stephen T Holgate, MD, DSc, FMedSci, Robert F Lemanske, Jr., MD and Robyn E O’Hehir, FRACP, PhD, FRCPath

Chapter 75: Eosinophilia and Eosinophil-Related Disorders
Prepared by: Anita Sivam, DO, University of Tennessee Health Science Center

1. Which of the following stimulate differentiation, maturation, and activation of eosinophils?
   a. IL-3, IL-4, IL-13
   b. IL-4, IL-5, IL-13
   c. GM-CSF, IL-3, IL-4
   d. GM-CSF, IL-3, IL-5
   e. GM-CSF, IL-3, IL-13

2. 65-year-old male with history of intermittent asthma and chronic rhinosinusitis who was vacationing in Brazil has bilateral arm and leg numbness for one day. Physical exam shows wheezing and hyperreflexia of lower extremities. Labs show eosinophil count of 8260/mL. What is the best course of action?
   a. Echocardiogram, troponin, CBC, CMP
   b. Imatinib 400 mg
   c. Prednisone 1 mg/kg
   d. Prednisone 1 mg/kg and ivermectin

3. Which diagnosis is most consistent with a clinical picture that includes recurrent sinopulmonary infections, persistent cutaneous viral infections and elevated IgE:
   a. DOCK8 deficiency
   b. Job’s syndrome
   c. NADPH oxidase deficiency
   d. Wiskott Aldrich syndrome

4. A 29-year-old male comes into the office with complains of chronic rhinitis. A nasal smear is done and shows marked eosinophilia. A skin test is performed and is negative. Patient does not have a history of asthma or aspirin sensitivity. What is this history suggestive of?
   a. Chronic sinusitis with nasal polyps
   b. Chronic sinusitis without nasal polyps
   c. Nonallergic rhinitis with eosinophilia syndrome
   d. Allergic rhinitis
   e. Atrophic rhinitis
5. A 14-year-old male with history of acne being treated with minocycline is brought to the emergency department for evaluation of acute worsening of facial, hand, and lower extremity edema. He has some subjective fevers and chills. Temperature is 38.2 C. On physical examination, you notice prominent facial edema and morbilliform eruption. Lab results show elevated LFTs and creatinine. Absolute eosinophil count is 2500/mL. What is a proposed mechanism that has been implicated in this diagnosis?
   a. Sequential reactivation of herpes viruses
   b. Genetic mutations in cytochrome p350 system
   c. Concurrent alcohol use with minocycline
   d. Undiagnosed immunodeficiency

6. What do primary granules of eosinophils contain?
   a. Major basic protein
   b. Eosinophil cationic protein
   c. Eosinophil peroxidase
   d. Charcot-Leyden crystals
   e. Eosinophil-derived neurotoxin

7. Which of the following chemokines help eosinophils migrate to the tissue?
   a. CCL-4
   b. CCL-5
   c. CXCL-8
   d. CCL-10
   e. CCL-13

8. A 68-year-old female with increased urinary frequency and dysuria is diagnosed with a urinary tract infection and treated with antibiotics. About 10 days later, she develops a dry hacking cough and dyspnea. She is noted to have crackles on examination. HSCT shows diffuse fine glass ground infiltrates. Peripheral blood eosinophil count is 1480/mL. What medication is suspected to cause eosinophilia and pulmonary infiltrates in this scenario?
   a. Ciprofloxacin
   b. Bactrim
   c. Nitrofurantoin
   d. Penicillin

9. A 28-year-old medical student recently returned from Kenya from a medical missions trip. She complains of pruritic rash for two months. Physical exam shows diffuse urticarial as well as a salmon-colored serpiginous lesion on her lower right back. Screening labs are drawn and show an absolute eosinophil count of 3500/mL. What is the most likely diagnosis?
   a. Cutaneous larva
   b. Strongyloidiasis
   c. Idiopathic hypereosinophilic syndrome
   d. Ascaris
10. A 72-year-old male with hepatosplenomegaly and petechiae is found to have increased anemia, thrombocytopenia, and increased serum B12 and tryptase. Patient is found to have deletion of 4q12. What should he be treated with?
   a. Imatinib
   b. Nothing, repeat labs in 3 months
   c. Methylprednisolone
   d. Benralizumab

Answers:

1. D. Page 1205. The three eosinophil growth factor cytokines are granulocyte-macrophage colony-stimulating factor (GM-CSF), IL-3, and IL-5.

2. D. Page 1212, 1218. This is the clinical picture of eosinophilic granulomatosis with polyangiitis (EGPA), now with neurologic involvement. Because the patient is having neurologic involvement, treatment must be started immediately, even before continuing workup. Treatment includes prednisone 1 mg/kg. However, ivermectin should be added to prevent disseminated strongyloidiasis due to the steroids. Imatinib is not effective in EGPA.

3. A. Page 1219. DOCK8 deficiency is an autosomal recessive form of Hyper-IgE syndrome. Clinical characteristics include viral skin infections with severe and difficult to treat HPV, HSV, VZV, and molluscum contagiosum. Patients can have pneumonias but no pneumatoceles (contrast to Job’s syndrome). Therapy includes IVIG and HSCT.

4. C. Page 1206. Nasal eosinophilia and sometimes blood eosinophilia are characteristic of nonallergic rhinitis with eosinophilia syndrome (NARES). These patients have nasal eosinophilia but have negative allergic histories, negative skin test results, normal IgE levels, normal bronchial responsiveness and no aspirin sensitivity.

5. A. Page 1208. This is DRESS due to minocycline use. Mechanisms that have been implicated in DRESS syndrome include drug detoxification enzyme abnormalities with subsequent accumulation of reactive drug metabolites, sequential reactivation of herpesviruses, such as cytomegalovirus, Epstein-Barr virus, human herpesvirus-6 and -7, and genetic predisposition associated with certain human leukocyte antigen alleles.


7. B. Review book, page 82. CCL-5 is also known as RANTES. Eotaxin (also known as eotaxin-1, CCL-11; eotaxin-2, CCL-24) is also a chemokine involved in helping eosinophils migrate to tissue.
8. **C.** Page 1207. Useful article: [https://www.jacionline.org/article/S0091-6749(10)00660-3/pdf](https://www.jacionline.org/article/S0091-6749(10)00660-3/pdf). Diverse agents can stimulate pulmonary eosinophilia. Symptoms including dyspnea, weight loss, cough, chest pain, and fever may appear acutely after ingestion. When rechallenged, pulmonary symptoms frequency recur within 48 hours, and infiltrates may develop in the same locations as the original infiltrates.

9. **B.** Page 1208. Although idiopathic HES is a possibility, given the travel history and the characteristic skin lesion ("larva currens"), strongyloidiasis is the most likely diagnosis. The lesions of cutaneous larva migrans are intensely pruritic, raised, and typically occur on the feet or other exposed areas. Whereas the dermatologic manifestations of drug eruption can be extremely varied and include urticaria, no medication history is given and a serpiginous lesion would be extraordinarily unusual.

10. **A.** This patient has HES with myeloproliferative features should be treated first line with tyrosine kinase inhibitor imatinib. Those with cardiac injury should be treated with prednisone at the same.