

**IMMUNOLOGY: Mary K. Crow, MD (Immunology); Bruce N. Cronstein, MD (Inflammation)**

- Anatomy and cellular elements of the immune system
  - Lymphoid organs: gross and microscopic anatomy and function
  - Organization of immune system: innate and adaptive responses
  - Specific cell types: ontogeny, structure, phenotype, function, and activation markers and cell membrane receptors
- Immune and inflammatory mechanisms
  - Antigen: types, structure, processing, presentation, and elimination
  - Components and regulation of innate immune system
  - Major histocompatibility complex: structure, function, and nomenclature
  - B-cell receptors and immunoglobulins: structure, function, antigen binding, signaling, genetic basis, and effector function
  - T-cell receptors: structure, function, antigen binding, signaling, and genetic basis
  - Receptor-ligand interactions, adhesion molecules, complement receptors, Fc receptors, and signal transduction
  - Complement and kinin systems: structure, function, and regulation
  - Acute-phase reactants and enzymatic defenses
- Cellular interactions, immune regulation, and immunomodulation
  - Activating and inhibitory immune receptors
  - Cellular activation, suppression, and regulation of each cell type
  - Origin, structure, effect, site of action, metabolism, and regulation of cytokines, chemokines, and other inflammatory mediators
  - Mechanisms of immune tolerance
- Immune responses
  - IgE-mediated: acute- and late-phase reactions
  - Immunoglobulin-mediated: opsonization, complement fixation, and antibody-dependent cellular cytotoxicity
  - Immune complex-mediated: physiochemical properties and clearance of immune complexes
  - Cell-mediated: cells and effector mechanisms in cellular cytotoxicity and granuloma formation
  - Mucosal immunity: interactions between gut and bronchus-associated lymphoid tissue and secretory IgA
  - Natural killer cells, lymphokine-activated killer cells, and graft-versus-host reaction
  - Autoantibodies
- Tissue destruction and repair
  - Cellular and molecular mediators

- Proteases and collagenases

### **CRYSTAL INDUCED ARTHROPATHIES: Theodore R. Fields, MD**

- **Gout**

- Primary gout
  - Asymptomatic hyperuricemia
  - Acute gout
  - Intercritical periods
  - Tophaceous gout
  - Conditions associated with gout
  - Lead intoxication
- Secondary gout
  - Lesch-Nyhan syndrome
  - Other secondary types of gout

- **Calcium pyrophosphate dihydrate deposition (CPPD)**

- Familial
- Secondary to primary metabolic disorders
- Idiopathic CPPD

- **Basic calcium phosphate crystal deposition**

### **INFECTIONS AND RELATED ARTHRITIDES: Leonard H. Calabrese, DO**

- **Infections**

- Bacterial (nongonococcal and gonococcal)
  - Native joint
  - Prosthetic joint
  - Spine
  - Bone
  - Soft tissue
- Mycobacterial
- Spirochetal (syphilis, Lyme disease)

- Viral (human immunodeficiency virus [HIV], hepatitis B virus, hepatitis C virus, parvovirus, chikungunya virus, and others)
- Fungal
- Parasitic
- Whipple's disease
- **Related arthritides**
  - Acute rheumatic fever and poststreptococcal arthritis
  - Arthritis associated with bacterial endocarditis
  - Postimmunization arthritis

#### **METABOLIC BONE DISEASE: Nancy E. Lane, MD**

- **Low bone mass**
- **Osteoporosis**
  - Primary
    - Postmenopausal
    - Male
  - Secondary
    - Medication-induced
- **Other causes of bone loss**
- **Paget's disease of bone**
- **Bone disease related to renal disease**
- **Osteomalacia**

#### **OSTEOARTHRITIS & RELATED DISORDERS: Marc C. Hochberg, MD, MPH**

- **Osteoarthritis**
- **Diffuse idiopathic skeletal hyperostosis (DISH)**
- **Malignant and nonmalignant tumors of bones, tendons, and joints**
  - Benign tumors
  - Malignant tumors
- **Osteonecrosis**

## **RHEUMATOID ARTHRITIS: Stephen A. Paget, MD**

- **Seropositive rheumatoid arthritis**
  - Early disease
  - Established disease
  - Late disease
- **Seronegative inflammatory polyarthritis**
- **Complications of established disease**
  - Extra-articular manifestations
  - Cardiovascular disease: atherosclerotic cardiovascular disease and congestive heart failure
  - Malignancy
  - Vasculitis
  - Immunologic considerations

## **SERONEGATIVE SPONDYLOARTHROPATHIES: John J. Cush, MD**

- **Ankylosing spondylitis**
  - Skeletal manifestations
  - Extra-articular manifestations
- **Reactive arthritis**
  - Skeletal manifestations
  - Extra-articular manifestations
- **Arthropathy associated with inflammatory bowel disease (IBD)**
  - Skeletal manifestations
  - Extra-articular manifestations
- **Psoriatic arthropathy**
  - Skeletal manifestations
  - Extra-articular manifestations
- **Arthritis associated with other skin diseases**
  - SAPHO syndrome (synovitis, acne, pustulosis, hyperostosis, and osteitis)
- **Undifferentiated spondyloarthropathies**
  - Skeletal manifestations
  - Extra-articular manifestations

## **OTHER RHEUMATIC AND CONNECTIVE TISSUE DISORDERS: Edward J. Parrish, MD**

- **Raynaud's phenomenon**
- **Primarily fibrosing rheumatic diseases**
  - Systemic sclerosis
    - Skin
    - Gastrointestinal
    - Cardiac
    - Pulmonary
    - Renal
  - Scleroderma mimics
    - Scleromyxedema
    - Nephrogenic fibrosis
    - Scleredema
  - Eosinophilic fasciitis
  - Retroperitoneal fibrosis (Ormond disease)
- **Primarily myopathic rheumatic diseases**
  - Polymyositis
  - Dermatomyositis
  - Inclusion body myositis
  - Metabolic myopathies
  - Medication-associated
  - Critical illness-associated
- **Sjögren's syndrome**
- **Primary antiphospholipid antibody syndrome**
- **Primarily skin-associated rheumatic diseases**
  - Erythema nodosum
  - Other forms of panniculitis
  - Multicentric reticulohistiocytosis
- **Fever-associated rheumatic disorders**
  - Autoinflammatory disorders
  - Adult-onset Still's disease (AOSD)

- Hemophagocytic lymphohistiocytosis and macrophage activation syndrome (HLH/MAS)
- **Primarily joint-associated rheumatic diseases**
  - Polymyalgia rheumatica (PMR)
  - Remitting seronegative symmetric synovitis with pitting edema (RS3PE)
  - Palindromic rheumatism
- **Miscellaneous rheumatic disorders**
  - Autoimmune hearing loss
  - Autoimmune eye disease
  - IgG4-related disease
  - Relapsing polychondritis
  - Overlap syndromes
  - Undifferentiated connective tissue disease
  - Mixed connective tissue disease
- **Pediatric disorders**
  - Juvenile idiopathic arthritis (JIA)
    - Childhood disease
    - Complications in adulthood
  - Kawasaki disease (KD)
  - Juvenile dermatomyositis (JDM)
  - Juvenile localized scleroderma (JLS)
  - Pediatric joint disorders seen in adulthood
    - Developmental dysplasia of the hip (DDH)
    - Slipped capital femoral epiphysis (SCFE)
    - Legg-Calvé-Perthes disease

#### **LUPUS ERYTHEMATOSUS: Michelle A. Petri, MD, MPH**

- **Drug-induced**
- **Cutaneous**
  - Isolated
  - In systemic disease

- **Renal**
  - Immune-mediated glomerular and tubular disease
  - Antiphospholipid antibody syndrome and microangiopathies
  - Renal insufficiency and hypertension
  - Urologic complications
- **Neurologic**
  - Central nervous system: inflammatory, vaso-occlusive, microangiopathies, and others
  - Spinal cord
  - Peripheral nerves
  - Neuromyelitis optica
  - Affective disorders
- **Pulmonary**
  - Pneumonitis
  - Thromboembolism
  - Pulmonary hypertension
  - Pneumonia
- **Cardiovascular**
  - Myocardial disease
  - Valvular disease
  - Accelerated atherosclerosis
- **Serositis**
- **Hematologic**
  - Autoimmune cytopenias
  - Hemolytic uremic syndrome (HUS) and thrombotic thrombocytopenic purpura (TTP)
  - Autoimmune clotting factor deficiencies (overlap with antiphospholipid antibody syndrome)
- **Musculoskeletal**
  - Joints, tendons, and ligaments
  - Muscle disease
- **Lupus in pregnancy**
  - Neonatal lupus
- **Vasculitis**

- **Antiphospholipid antibody syndrome (APS)**
  - Clinical features excluding pregnancy
  - Pregnancy
  - Catastrophic APS

#### **NONARTICULAR AND REGIONAL MUSCULOSKELETAL DISORDERS: Terence W. Starz, MD**

- **Diffuse pain syndromes**
  - Fibromyalgia
  - Complex regional pain syndrome (reflex sympathetic dystrophy)
  - Medication-induced diffuse pain
- **Regional musculoskeletal disorders**
  - Axial syndromes
    - Back pain
    - Neck pain
    - Thoracic outlet syndrome
  - Shoulder disorders
    - Joint
    - Soft tissue
  - Elbow disorders
    - Joint
    - Soft tissue
  - Wrist and hand disorders
    - Joint
    - Soft tissue
  - Hip disorders
    - Joint
    - Soft tissue
  - Knee disorders
    - Joint
    - Soft tissue
  - Ankle and foot disorders



- Joint
  - Soft tissue
- Leg disorders
- **Neuropathies**
  - Axial disorders
  - Peripheral disorders
    - Entrapment neuropathies
    - Mononeuritis multiplex
    - Polyneuropathy
    - Small fiber neuropathy

#### **NONRHEUMATIC SYSTEMIC DISORDERS: Karen B. Onel, MD**

- **Hereditary, congenital, and inborn errors of metabolism associated with rheumatic syndromes**
  - Disorders of connective tissue
    - Marfan syndrome
    - Osteogenesis imperfecta
    - Ehlers-Danlos syndromes
    - Pseudoxanthoma elasticum
    - Hypermobility syndrome
  - Mucopolysaccharidoses
  - Osteochondrodysplasias
    - Multiple epiphyseal dysplasia
    - Spondyloepiphyseal dysplasia
  - Inborn errors of metabolism affecting connective tissue
    - Homocystinuria
    - Ochronosis
  - Storage disorders
- **Immunodeficiencies**
  - Immunoglobulin A (IgA) deficiency
  - Complement component deficiencies
  - Severe combined immunodeficiency (SCID) and adenosine deaminase (ADA) deficiency

- Purine nucleoside phosphorylase (PNP) deficiency
- Common variable immunodeficiency

#### **NONRHEUMATIC SYSTEMIC DISORDERS: C. Ronald MacKenzie, MD**

- **Metabolic-associated rheumatic disorders**
  - Diabetes mellitus
  - Acromegaly
  - Thyroid disease
  - Cushing's disease
  - Parathyroid disease
  - Renal failure and dialysis
- **Hematologic and oncologic malignancy-associated rheumatic disorders**
  - Amyloidosis
    - Primary
    - Secondary
    - Hereditary
  - Lymphoma
  - Myelodysplastic syndromes
  - Leukemia
  - Solid tumors
  - Plasma cell dyscrasias
  - Hemoglobinopathies
    - Sickle cell
  - Hemophilias

#### **VASCULITIDES: Robert F. Spiera, MD**

- **Large-vessel vasculitis**
  - Takayasu's arteritis
  - Giant cell arteritis
- **Medium-vessel vasculitis**
  - Polyarteritis nodosa

- **Small-vessel vasculitis**
  - Antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis
    - Granulomatosis with polyangiitis (Wegener's)
    - Microscopic polyangiitis
    - Eosinophilic granulomatosis with polyangiitis (Churg-Strauss)
  - Immune complex small-vessel vasculitis
    - Anti-glomerular basement membrane disease
    - Cryoglobulinemic vasculitis
    - IgA vasculitis (Henoch-Schönlein purpura)
    - Hypocomplementemic urticarial vasculitis (anti-C1q vasculitis)
- **Variable-vessel vasculitis**
  - Behçet's disease
  - Cogan's syndrome
- **Single-organ vasculitis**
  - Cutaneous leukocytoclastic angiitis
  - Cutaneous arteritis
  - Primary central nervous system angiitis
  - Isolated aortitis
- **Vasculitis associated with probable etiology**
  - Hepatitis C virus-associated cryoglobulinemic vasculitis
  - Hepatitis B virus-associated vasculitis
  - Syphilis-associated aortitis
  - Drug-induced vasculitis
    - Drug-induced ANCA-associated vasculitis
    - Drug-induced immune complex vasculitis
    - Other drug-induced vasculitis
  - Cancer-associated vasculitis
- **Vasculitis mimickers**
  - Buerger's disease (thromboangiitis obliterans)
  - Cholesterol emboli
  - Fibromuscular dysplasia

- Segmented arterial mediolysis
- Warfarin necrosis
- Reversible cerebral vasoconstriction syndrome
- Moyamoya disease
- Atrial myxoma
- Ergotism
- Endocarditis
- Calciphylaxis