

Cope AP, editor. **Arthritis Research: Methods and Protocols.** (Walker JM, series editor. *Methods in Molecular Medicine*). Totowa, New Jersey: Humana Press; 2007. Volume 1 (series volume 135), 446 pages. ISBN 1-58829-344-0; price: US \$149.00 and Volume 2 (series volume 136), 432 pages. ISBN 1-58829-344-X; price: US \$149.00.

Field of medicine: Rheumatology, immunology.

Format: Hardcover book.

Audience: Biomedical research investigators in the field of bone biology and immunology, as well as rheumatologists, immunologists, pathologists, and other clinicians interested novel insights in the pathogenesis and diagnostics of chronic joint diseases.

Purpose: Chronic joint diseases affect more than a third of population and represent a major health problem due to their progressive morbidity, disability, and only partially successful therapy. Having in mind the importance of this topic, the two volumes of *Arthritis Research: Methods and Protocols* are a valuable source of updated knowledge of new technologies and methods specifically designed to study cellular and molecular mechanisms in arthritis. The book not only describes conventional and novel diagnostic procedures in arthritis but also addresses the available mouse models to study rheumatic disease. The last part describes the methods available for defining novel therapeutic targets, which may have clinical implications in developing regenerative therapeutic strategy aimed to achieve not only control of inflammatory and destructive processes but also stimulation of compensatory anabolic reaction and repair.

Content: *Arthritis Research Methods and Protocols* consist of two volumes, with a total 55 chapters accompanied with schematic diagrams, figures, color plates, and tables. Typically, each chapter consists of a short summary with key words, followed by introduction, materials, methods, notes, and references sections. Within the materials section, each chapter provides a detailed description of sample sources, chemicals and reagents, labwear, as well as necessary equipment. The methods describe all the procedures in a step-by-step manner, with necessary details sufficient for the implementation of a specific technique. Protocols are followed by notes on troubleshooting to avoid potential pitfalls. Finally, each chapter ends with the references that list the important literature for the methodology described within the chapter. At the end of each volume, an index allows quick orientation through basic terms and selective reading related to the method in question.

The Volume 1 has three parts, each consisting of several chapters. The first part, entitled *Synovial Joint Morphology, Histopathology and Immunohistochemistry*, describes in eight chapters the procedures important for the analysis of synovial tissue of the inflamed joints. These chapters include imaging of the inflamed synovial joints, immunohis-

tochemistry of the inflamed synovium, in situ hybridization of synovial tissue, subtractive hybridization as a method for differential screening, laser capture for the analysis of gene expression, preparation of mononuclear cells from synovial tissue, and quantitative image analysis of synovial tissue. The second part, entitled *Cartilage Matrix and Bone Biology*, includes 10 chapters, which present methods for the analysis of the structural and functional changes of cartilage and bone tissues in human samples or animal models of arthritis. The methods include cartilage histomorphometry, image analysis of aggrecan degradation in articular cartilage, in situ detection of cell death in articular cartilage, measurement of glycosaminoglycan release from cartilage explants, assessment of collagenase and gelatinase expression and activity in articular cartilage, analysis of MT1-matrix metalloproteinase and their expression and activity in cells, bone histomorphometry in arthritis models, generation of osteoclasts in vitro, and assays of osteoclast activity. The last part, entitled *Cell Trafficking, Migration and Invasion* consists of 10 chapters, focusing on the protocols aimed to reveal migration patterns, functional changes, and pathogenic role of several cell types involved in the generation of local arthritic lesions, particularly leukocytes, synovial fibroblasts, and endothelial cells. These protocols describe isolation and analysis of endothelial cells, analysis of leukocyte recruitment in synovial microcirculation by intravital microscopy, analysis of angiogenesis in arthritis, analysis of inflammatory leukocyte and endothelial chemotaxis activity, culture and phenotyping of synovial fibroblasts, genotyping of synovial fibroblasts by cDNA array in combination with RNA arbitrarily primed polymerase chain reaction, gene transfer to synovial fibroblasts in severe combined immunodeficient (SCID) mouse model, in vitro matrigel fibroblast invasion assay, and culture of circulating fibrocytes.

The Volume 2 also consists of three parts divided into several chapters. The first part, entitled *Immunobiology*, includes 12 chapters that summarize methods important for phenotypic and functional analysis of several immune cell populations, such as B-cell subsets, T-cell subsets, synovial natural killer cells, and synovial dendritic cells. The chapters describe phenotypic analysis of B-cells and plasma cells, detection of antigen specific B-cells in tissues, single-cell analysis of synovial tissue B-cells, tracking antigen specific CD4⁺ T-cells with soluble major histocompatibility complex molecules, analysis of antigen reactive T-cells, identification and manipulation of antigen specific T-cells with artificial antigen presenting cells, analysis of Th1/Th2 T-cell subsets, analysis of synovial T-cell receptor repertoire, assessment of T-cell apoptosis in synovial fluid, assay of T-cell contact dependent monocyte-macrophage functions, and phenotypic and functional analysis of synovial natural killer and dendritic cells. The second part entitled *Animal Models of Arthritis* describes mouse and rat models of arthritis that resemble human joint diseases, mainly rheumatoid arthritis and osteoarthritis. These models are described in detail throughout nine chapters, including the overview of the use of animal models for rheumatoid arthritis, collagen-induced arthritis in mice, collagen antibody induced arthritis, arthritis induced with minor cartilage proteins, murine antigen-induced arthritis, rat pristane-induced arthritis, inflammatory arthritis in K/BxN mouse model, and osteoarthritis in Del1 mouse model. The last part, entitled *Application of New Technologies to Define Novel Therapeutic Targets*, includes six chapters that focus on state-of-the-art procedures available for studying chronic joint diseases with the potential for developing new therapeutic strategies aimed to reduce cartilage and bone destruction. These chapters describe gene expression profiling in rheumatology, differential display reverse transcription polymerase

chain reaction to identify novel biomolecules in arthritis research, two-dimensional electrophoresis of proteins secreted from articular cartilage, proteomic approach to map lymphocyte plasma membrane proteins, in vivo phage display selection in the human/SCID mouse chimera model for defining synovial specific determinants, and adenoviral targeting of signal transduction pathways in synovial cell cultures.

Highlights: Both volumes together present a comprehensive set of protocols summarizing “decades of experience and expertise” in the understanding of the pathological processes in rheumatic disease. The list of experienced contributors from different basic and clinical fields, such as cell and molecular biology, immunology, rheumatology, inflammation, immunogenetics, biochemistry, is impressive. They offer a spectrum of cutting-edge technologies, some of which are “still evolving and whose impact is yet to be determined.” The included protocols are highly reproducible and reliable, presented in a step-by-step way suitable even for novice investigators

who need profound and practical information to get started. The book not only provides up-dated knowledge in a specific field and detailed descriptions of related methods, but also includes a section on troubleshooting in each chapter indicated in the notes section.

Related reading: Many other books from the Methods in Molecular Biology Series provide high-quality information for researchers as well as clinicians. Among many, recently published volumes are related to rheumatology and immunology, such as Allergy Methods and Protocols, Interferon Methods and Protocols, Microarrays in Clinical Diagnostics, Adoptive Immunotherapy, Human Cell Culture Protocols, Antisense Therapeutics, Developmental Hematopoiesis, Autoimmunity, and Cartilage and Osteoarthritis. Each volume is edited by acknowledged experts and presents reliable set of techniques on specific topics.

Danka Grčević

danka.grcevic@mef.hr