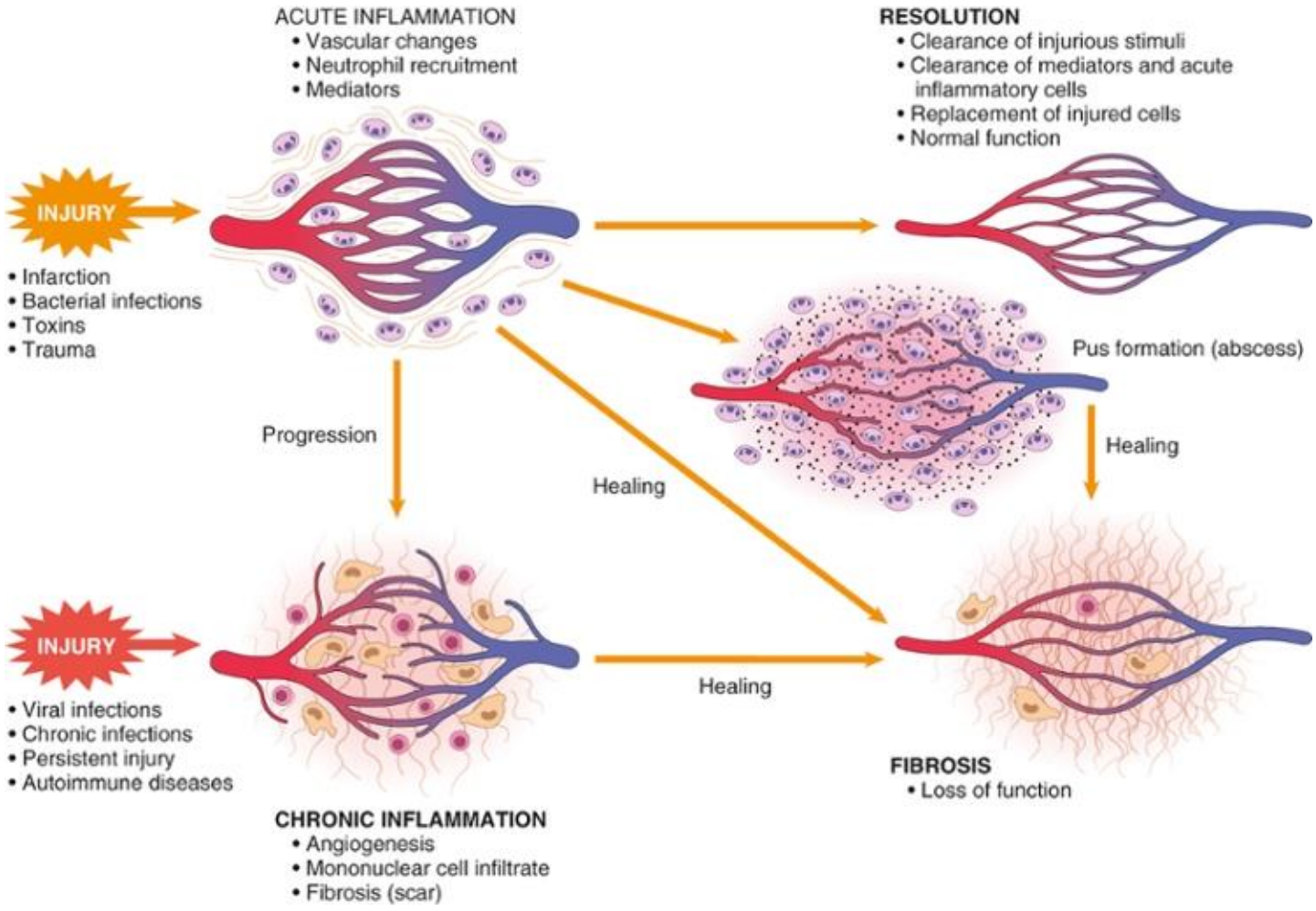
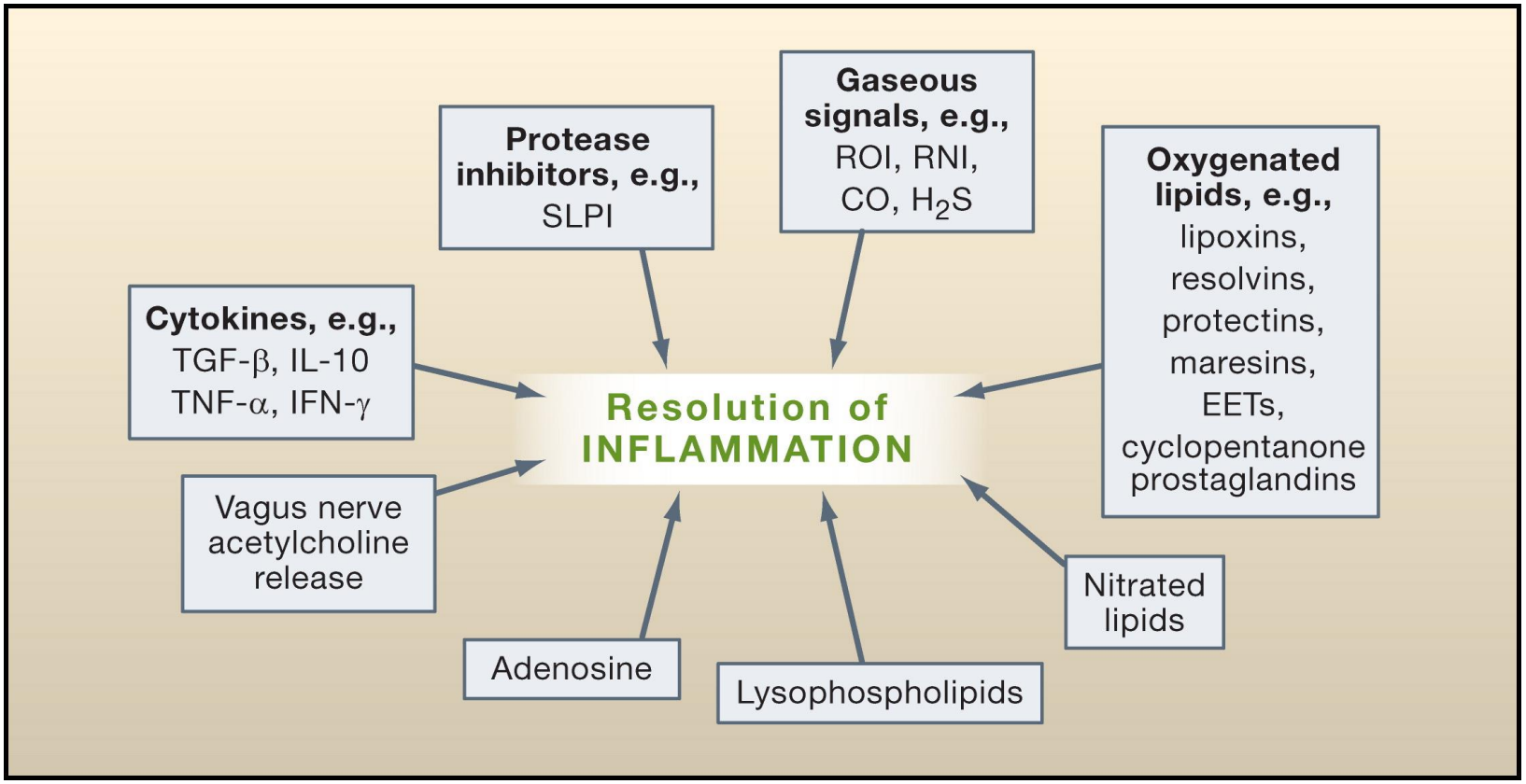
Chronic inflammation
lab 4

Resolving and nonresolving inflammation

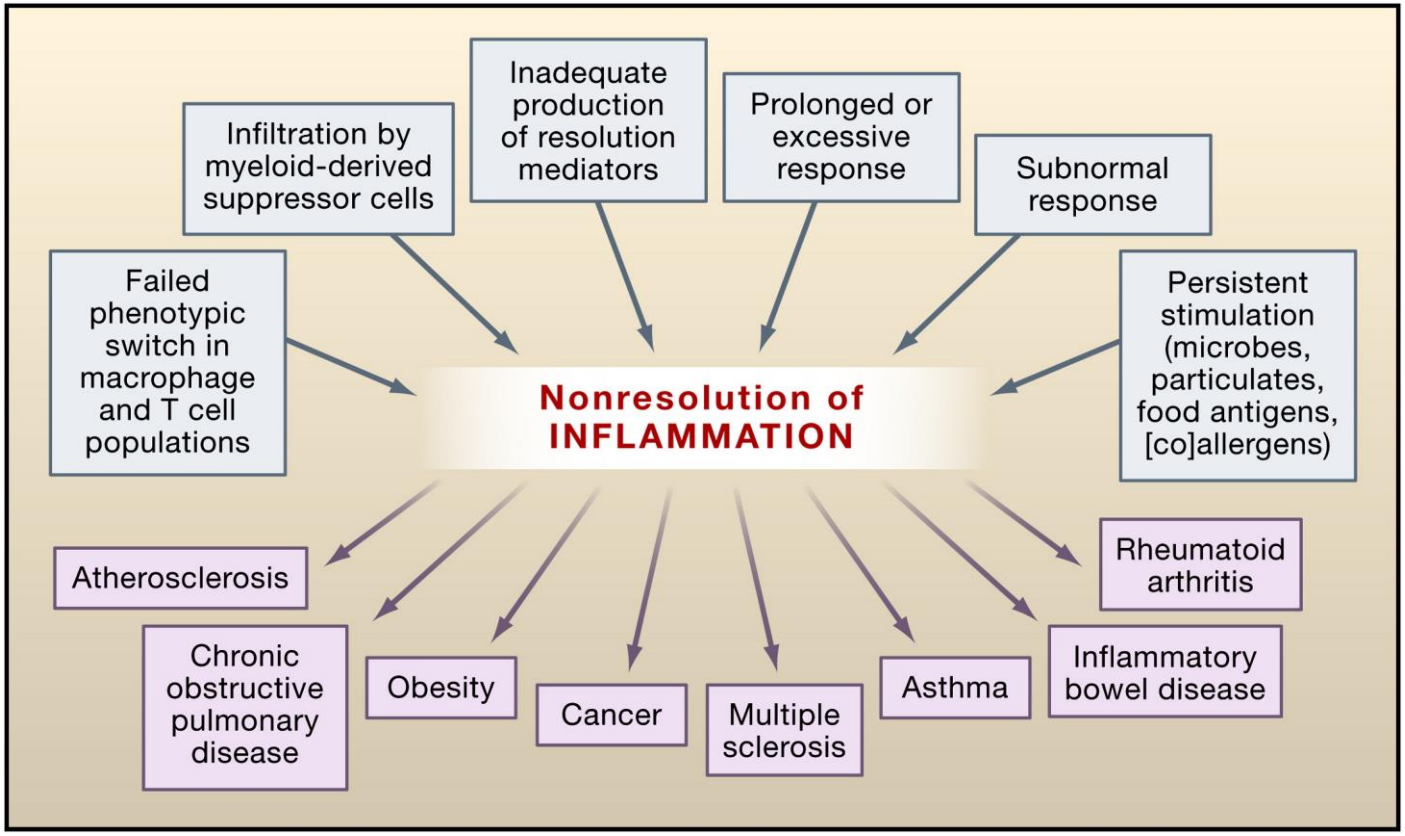


Factors required to resolve acute Inflammation



Cell 2010 140, 871-882DOI: (10.1016/j.cell.2010.02.029)

Nonresolving Inflammation

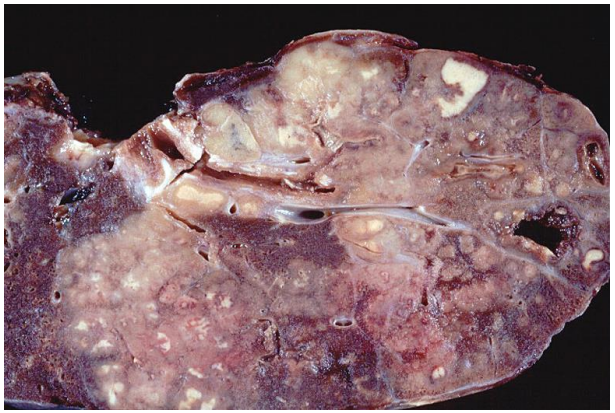


Cell 2010 140, 871-882DOI: (10.1016/j.cell.2010.02.029)

Chronic inflammation

"Chronic inflammation is a response of prolonged duration (weeks or months) in which inflammation, tissue injury, and attempts at repair coexist, in varying combinations",

Persistent infections



Tuberculosis

Hypersensitivity

Rheumatoid Arthritis

Toxic agents

Silicosis

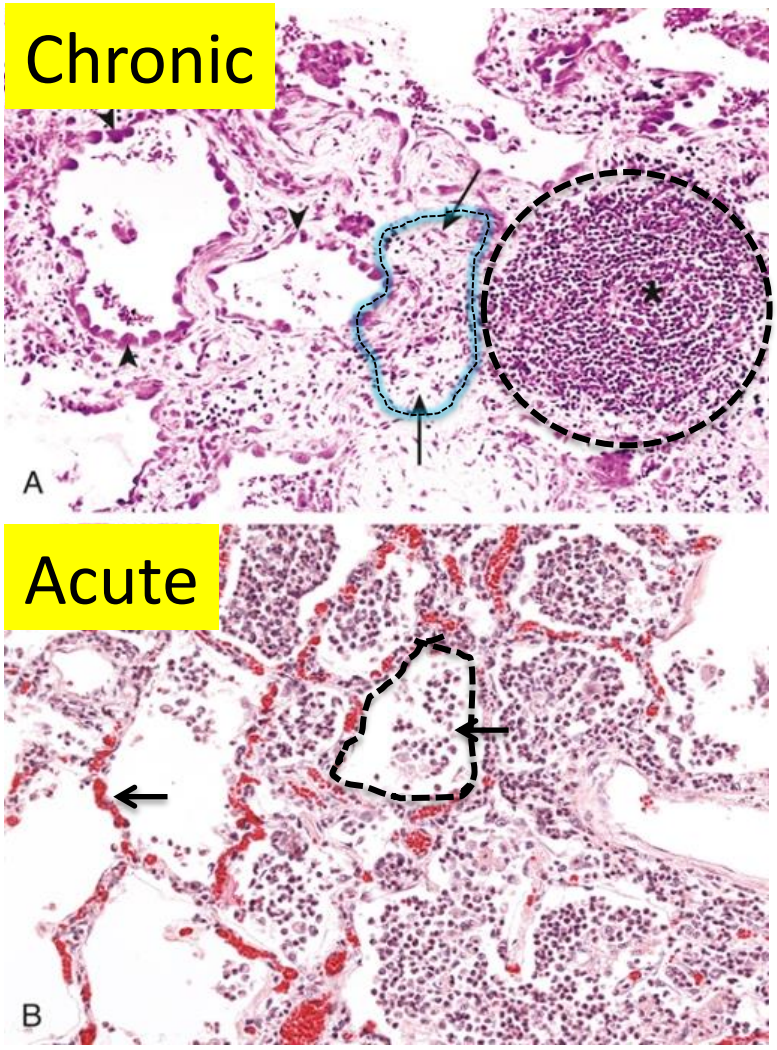
Morphologic Features

1. Infiltration with mononuclear cells, which include macrophages, lymphocytes, and plasma cells;

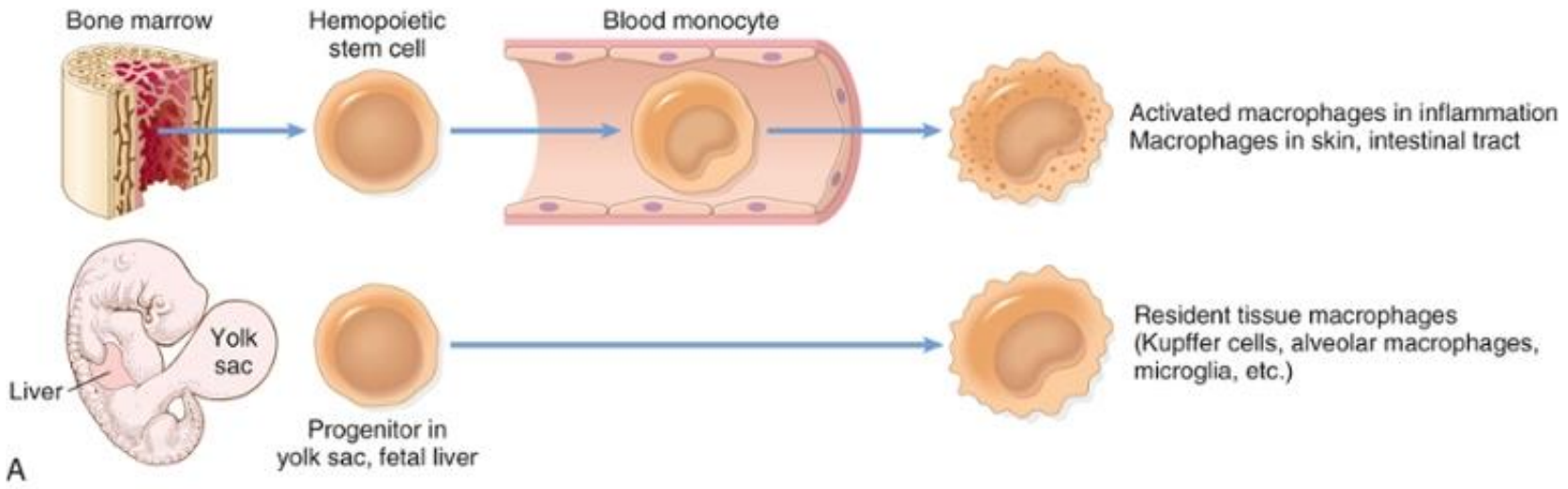
1. Destruction of parenchyma;

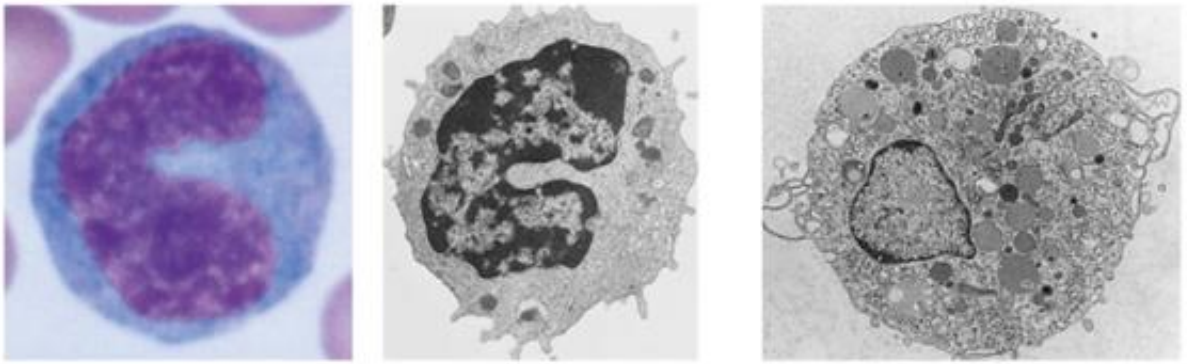
2. Replacement of damaged tissue with angiogenesis and fibrosis.

Lung

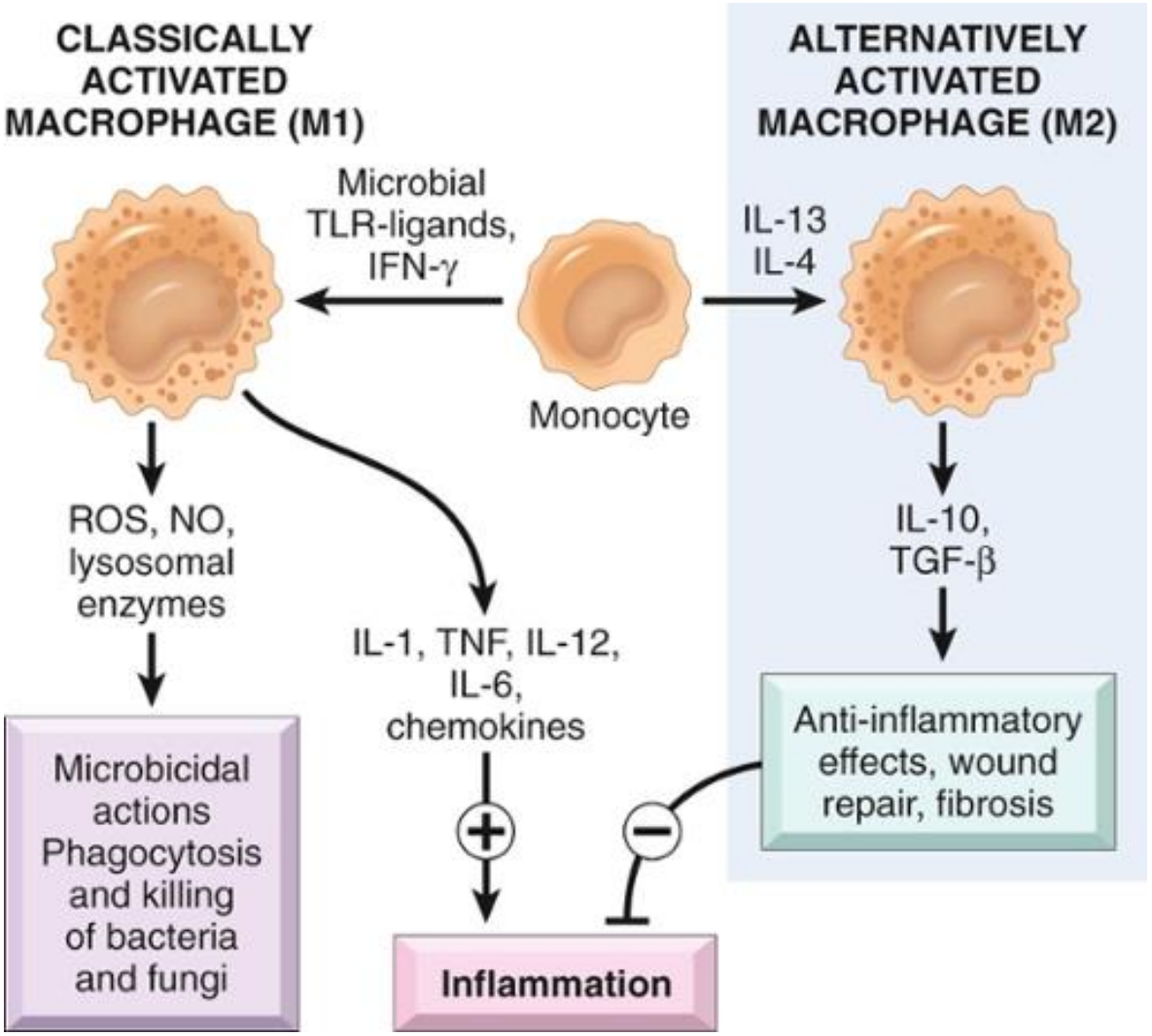


Cells and Mediators: Macrophages

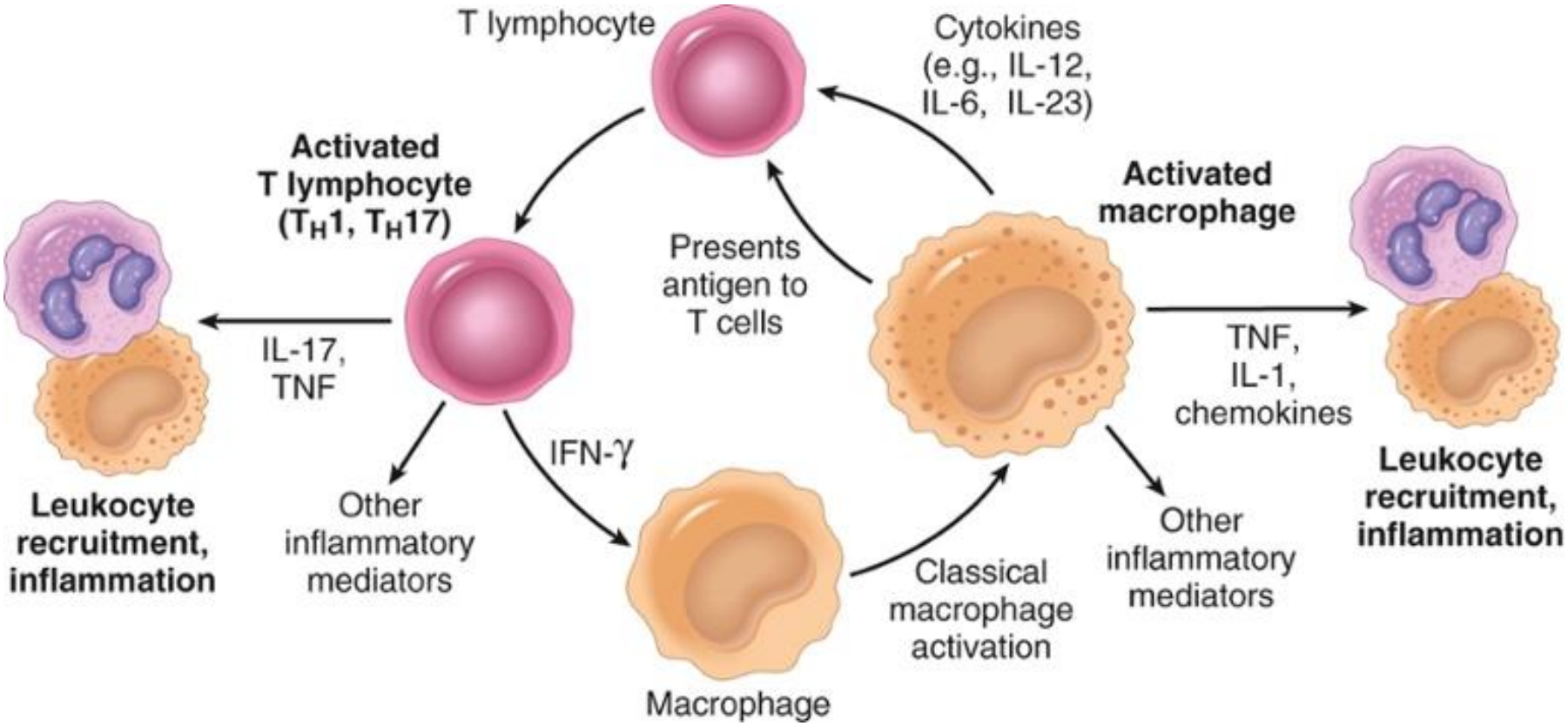




Macrophages subsets

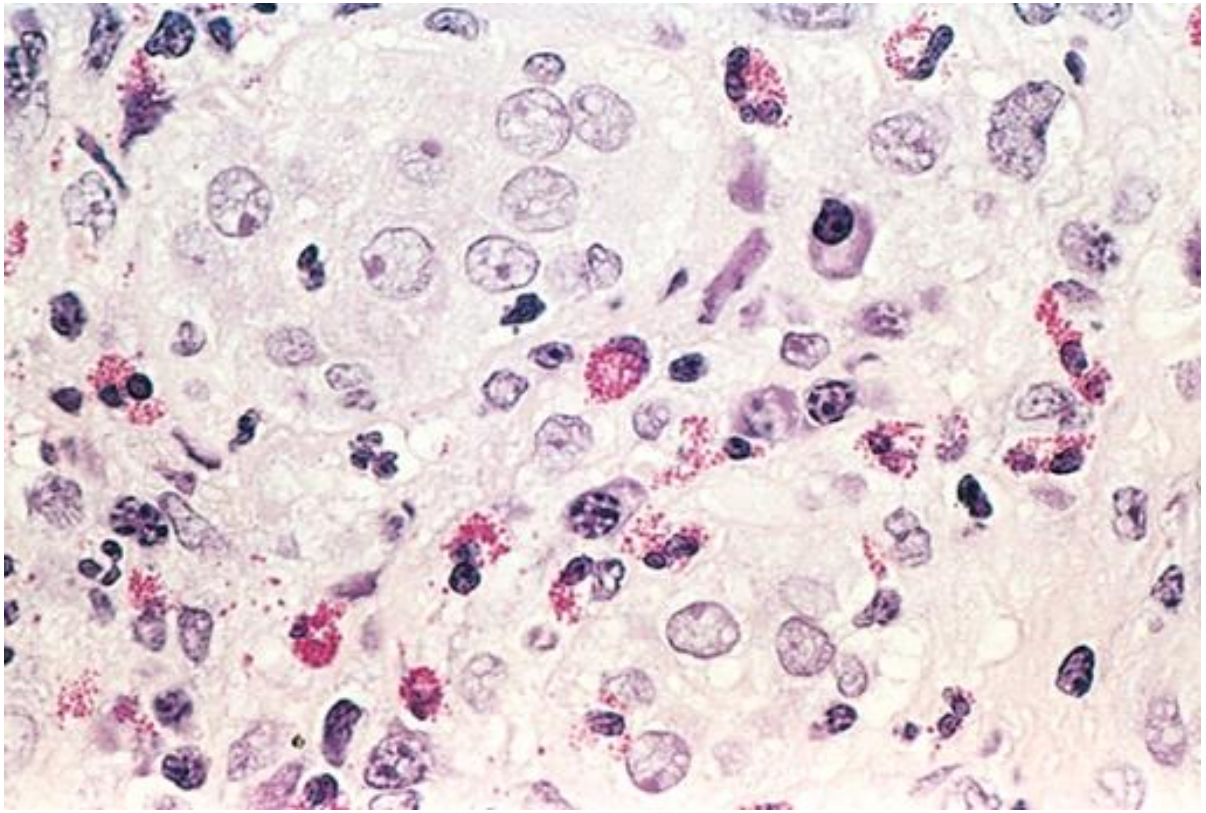


T Lymphocytes



Leucocytes

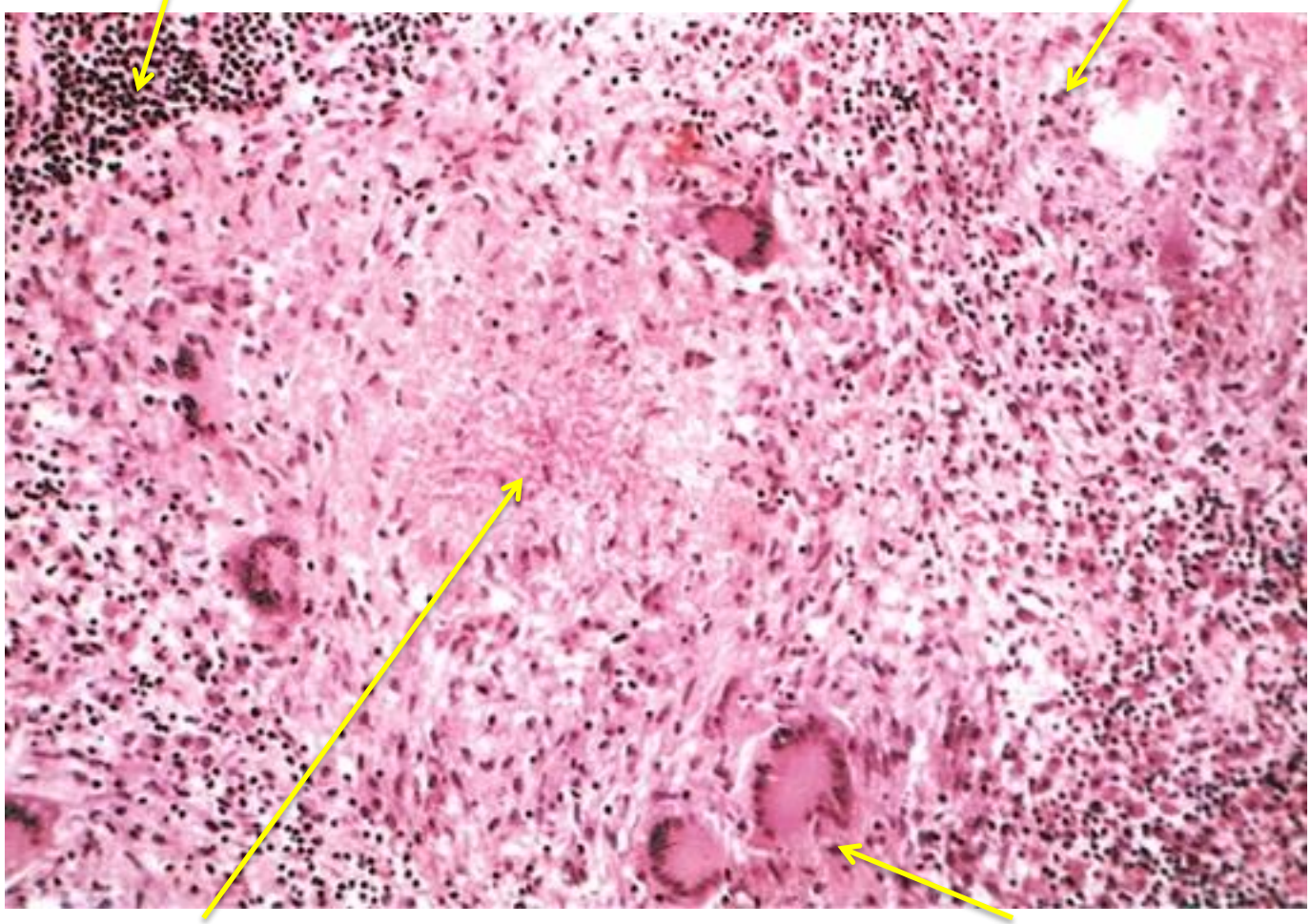
- Eosinophil
- Mast cells
- Neutrophil



Granulomatous Inflammation

Lymphocytes

Epitheliod cells



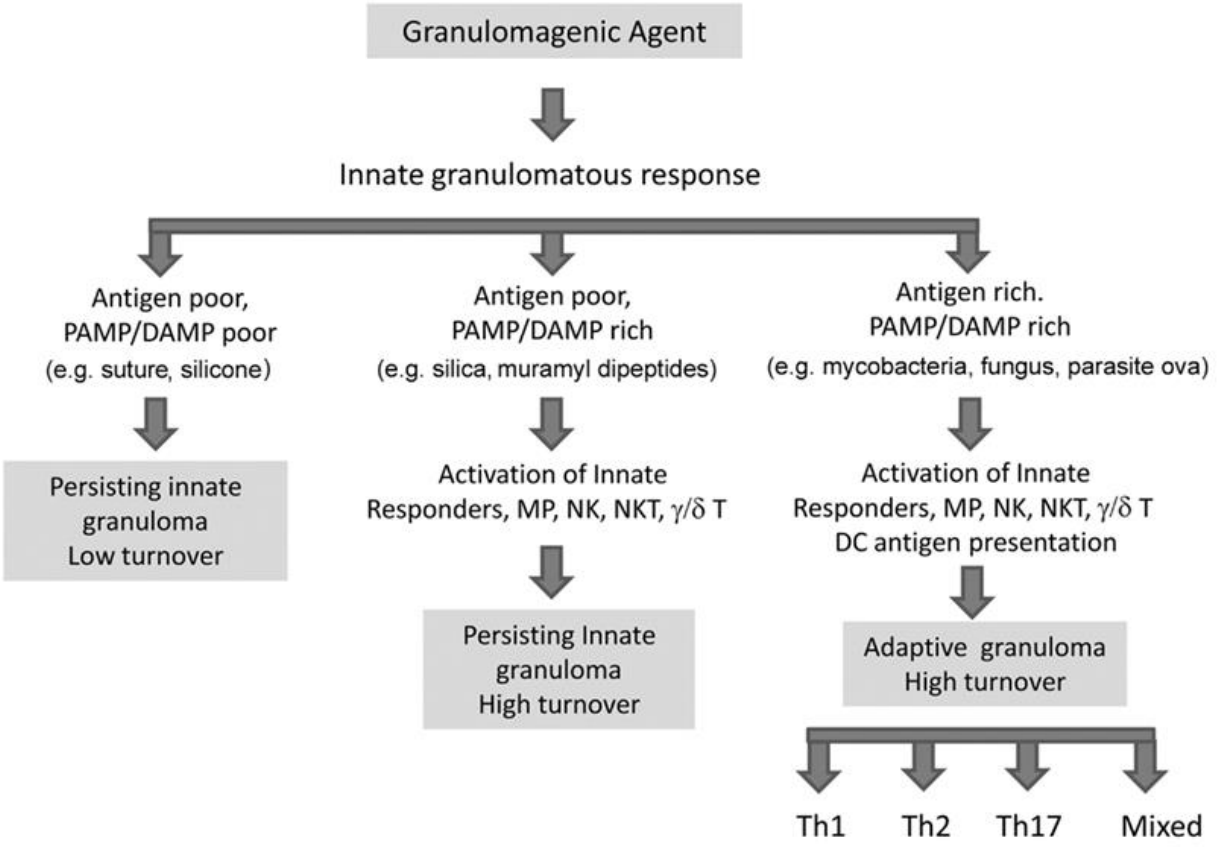
Central necrosis

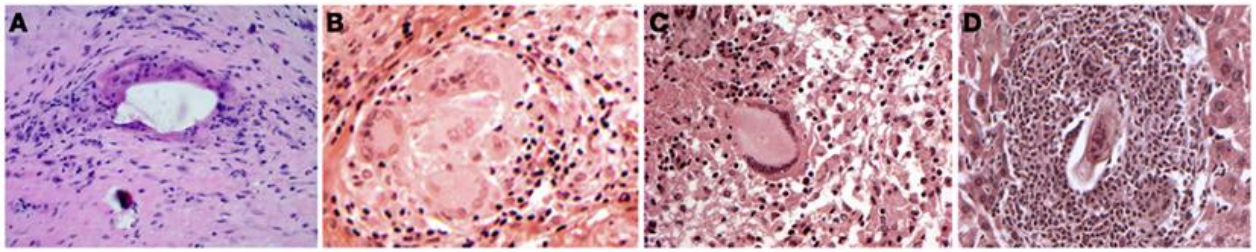
Multinucleate giant cells

Morphologic patterns in granulomatous diseases

Disease	Cause	Tissue Reaction
Tuberculosis	*Mycobacterium tuberculosis*	Caseating granuloma (tubercle): focus of activated macrophages (epithelioid cells), rimmed by fibroblasts, lymphocytes, histiocytes, occasional Langhans giant cells; central necrosis with amorphous granular debris; acid-fast bacilli
Leprosy	*Mycobacterium leprae*	Acid-fast bacilli in macrophages; noncaseating granulomas
Syphilis	*Treponema pallidum*	Gumma: microscopic to grossly visible lesion, enclosing wall of macrophages; plasma cell infiltrate; central cells are necrotic without loss of cellular outline; organisms difficult to identify in tissue
Cat-scratch disease	Gram-negative bacillus	Rounded or stellate granuloma containing central granular debris and recognizable neutrophils; giant cells uncommon
Sarcoidosis	Unknown etiology	Noncaseating granulomas with abundant activated macrophages
Crohn disease (inflammatory bowel disease)	Immune reaction against undefined gut microbes and, possibly, self antigens	Occasional noncaseating granulomas in the wall of the intestine, with dense chronic inflammatory infiltrate

Mechanisms of granulomas formation





Summary

Chronic Inflammation

- Chronic inflammation is a prolonged host response to persistent stimuli that may follow unresolved acute inflammation or be chronic from the outset.
- It is caused by microbes that resist elimination, immune responses against self and environmental antigens, and some toxic substances (e.g., silica); underlies many medically important diseases.
- It is characterized by coexisting inflammation, tissue injury, attempted repair by scarring, and immune response.
- The cellular infiltrate consists of macrophages, lymphocytes, plasma cells, and other leukocytes.
- It is mediated by cytokines produced by macrophages and lymphocytes (notably T lymphocytes); bidirectional interactions between these cells tend to amplify and prolong the inflammatory reaction.
- Granulomatous inflammation is a morphologically specific pattern of chronic inflammation induced by T cell and macrophage activation in response to an agent that is resistant to eradication.