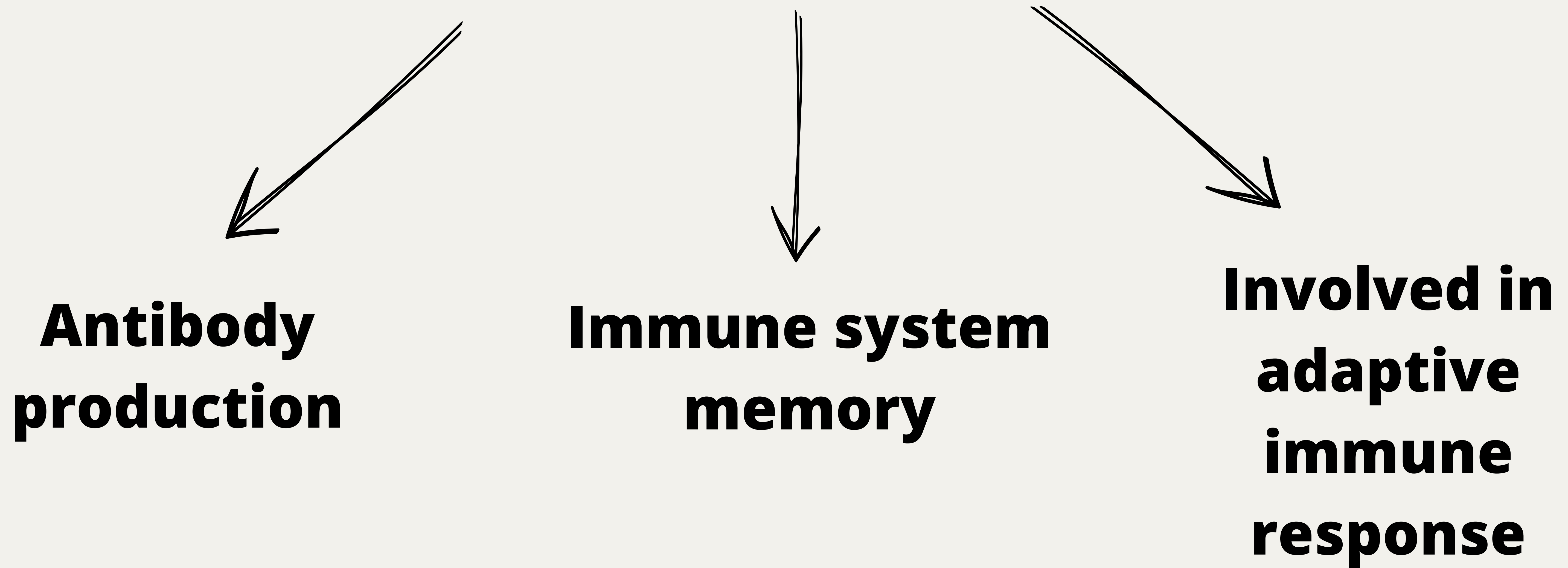


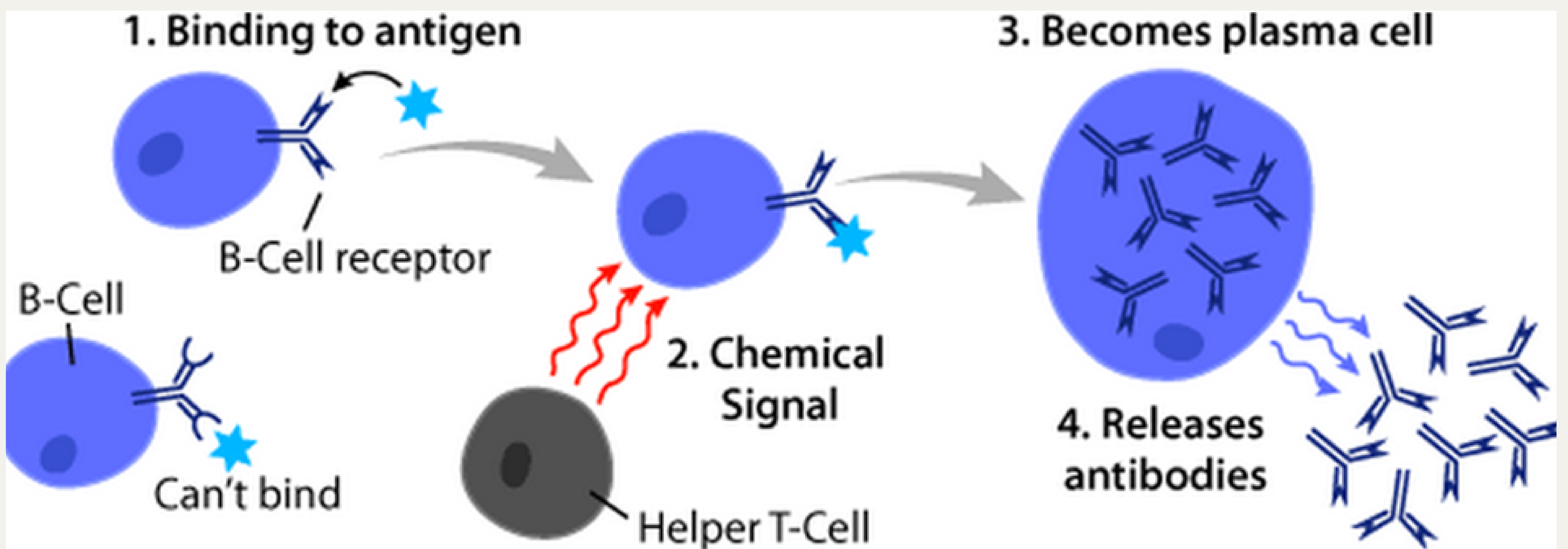
# B Cells

## B Cell Functions



**There are more than 7 types of B cells**

- **Plasma cells**
- **Memory B cells**
- **Regulatory B (Breg) cells**
- **Effector B (Beffs) cells**



# Regulatory and Effector B Cells



Characteristics	Bregs	Beffs
<b>Role during the AD</b>	Negatively regulate immune responses	Have disease promoting functions
<b>Cytokines</b>	Anti-inflammatory cytokines (IL-10, IL-35, and TGF- $\beta$ )	Proinflammatory cytokines (IL-6, interferon (IFN)-g and GM-CSF)

Matsushita T. Regulatory and effector B cells: Friends or foes? J Dermatol Sci. 2019 Jan;93(1):2-7. doi: 10.1016/j.jdermsci.2018.11.008. Epub 2018 Nov 23. PMID: 30514664.

**\*AD = Autoimmune Disease**

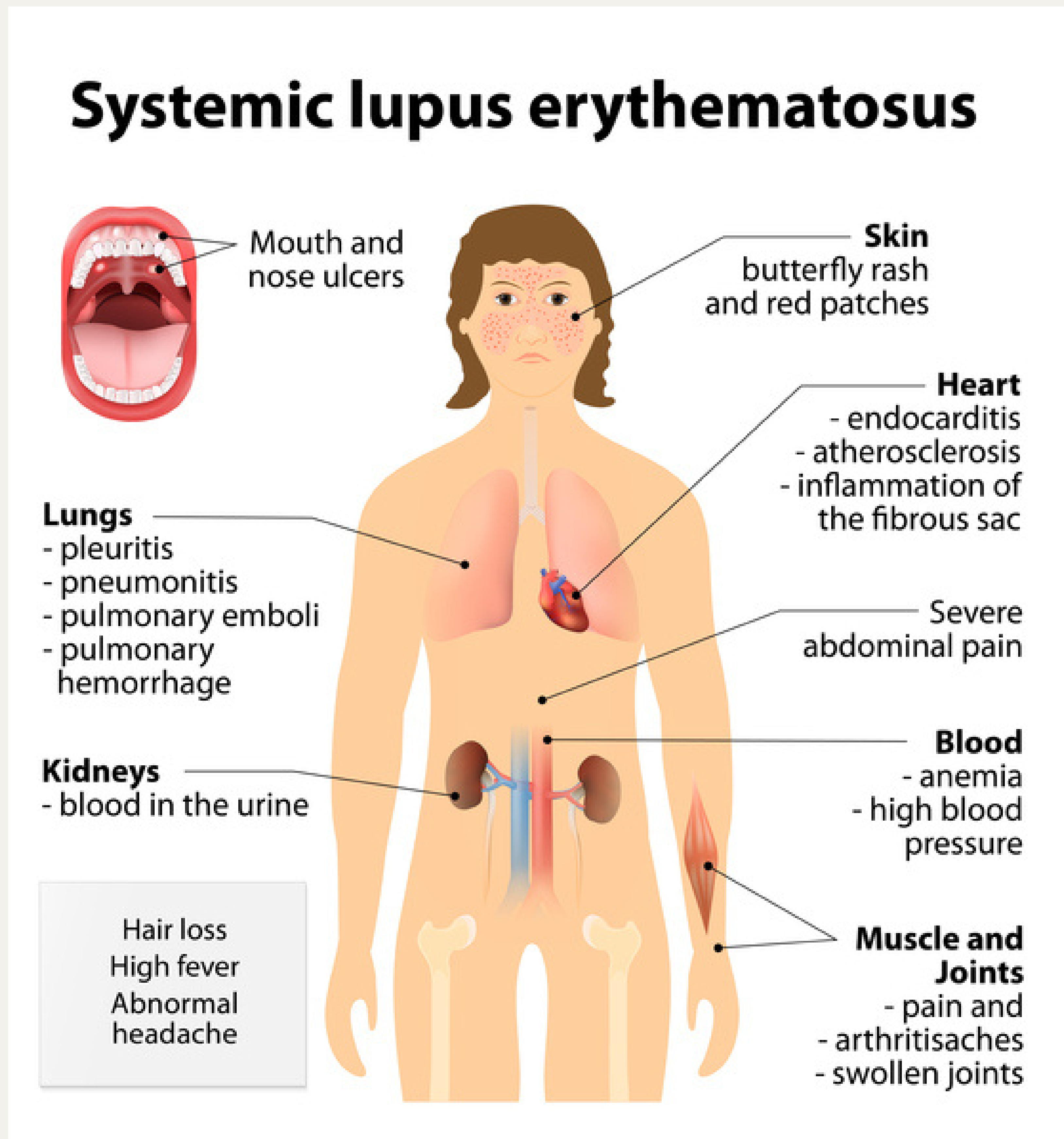
# Autoimmune Diseases

**Autoimmune diseases** are conditions when the immune system attacks its own healthy cells, tissues, and organs by mistake

- **10-45 % of people have ANA antibodies;**
- **Only 5-10 % of them will later have autoimmune diseases;**
- **80 % of all people diagnosed with AD are women;**

# Autoimmune Diseases

## Systemic lupus erythematosus (SLE)



## Systemic sclerosis (SSc)

## Rheumatoid arthritis (RA)

### CLINICAL MANIFESTATIONS OF SYSTEMIC SCLERODERMA

Scleroderma can impact many regions of the body and cause a wide variety of health challenges.

#### NEUROLOGIC

- ▶ Hypertensive Encephalopathy
- ▶ Cerebral Hemorrhage
- ▶ Headache/Altered Mental Status
- ▶ Seizures

#### RENAL

- ▶ Acute Kidney Injury
- ▶ Electrolyte Abnormalities
- ▶ Hematuria/Proteinuria
- ▶ Decreased Urine Output

#### GASTROINTESTINAL

- ▶ Esophageal Dysfunction
- ▶ Elevated Liver Enzymes

#### OPHTHALMOLOGIC

- ▶ Hypertensive-Retinopathy
- ▶ Altered Vision

#### CARDIOVASCULAR

- ▶ Congestive Heart Failure
- ▶ Hypertension
- ▶ Pericardial Effusion
- ▶ Pericarditis
- ▶ Arrhythmias

#### SYSTEMIC

- ▶ Thrombocytopenia
- ▶ Microangiopathic Hemolytic Anemia
- ▶ Fatigue
- ▶ Weight Loss

#### PULMONARY

- ▶ Rapidly Progressive Dyspnea
- ▶ Pulmonary Edema
- ▶ Pulmonary Hemorrhage

#### MUSCULOSKELETAL

- ▶ Skin Thickening/Sclerodactyly
- ▶ Swollen hands and Lower Extremities
- ▶ Carpal Tunnel Syndrome
- ▶ Tendon Friction Rubs
- ▶ Polyarthritis
- ▶ Raynaud's Phenomenon

### How Rheumatoid Arthritis Affects the Body

