

Autoimmune disease

Lectuer (12) •

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Autoimmune diseases

- Immune reaction against self Ags.



Disease (autoimmune)

- *Chronic*
- *Irreversible*

Autoimmune disease

Autoimmunity : •

Normally the immune system known its own tissues as self and does not react to them . Rarely, however there is a breakdown in this recognition and the immune system destroy its own tissue a phenomena termed autoimmunity As specificity repertoires that are expressed by both T- and B-Cells are random .



it is no surprising that antiself •
specificities occur , there are
mechanism which kill these self -
reactive cell , as described earlier ,
but some escape this surveillance ,
some autoimmune disease are
triggered by microbial antigen which
mimic or cross – react with self
components.



Classification of autoimmune disease:

The organ specific when the specific pathology is confined to particular organ : (eg: Hashimoto's disease , pernicious anaemia , Addison's disease)

And when the pathology is not confined to particular organ the disorder were placed under the head non-organ specific . systemic lupus erythematosus, rheumatoid arthritis, dermatomyositis



organ-specific

non-organ-specific

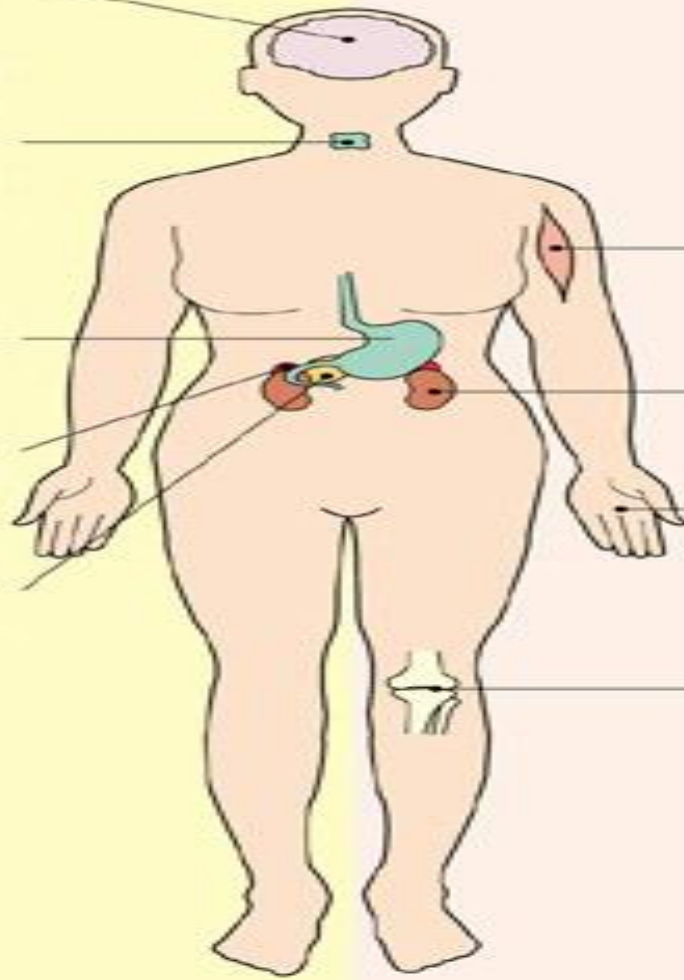
brain
multiple sclerosis(?)

thyroid
Hashimoto's
thyroiditis
primary myxoedema
thyrotoxicosis

stomach
pernicious anaemia

adrenal
Addison's disease

pancreas
insulin-dependent
diabetes mellitus



muscle
dermatomyositis

kidney
SLE

skin
scleroderma
SLE

joints
rheumatoid arthritis

Moreover autoimmune disorder may overlap that mean a patient have more than one organ-specific disease & more than one systemic disease

Based on the clinical experimental studies it has been suggested that autoimmunity may arise due to an immunologic imbalance with excessive B-cell activity & diminished suppressor T-cell activity. This imbalance may occur as a consequence of genetic , viral and environmental mechanisms acting singly or combination .



Autoimmune diseases can be caused by: •

1-Microbial antigen cross- reacting with self antigens. •

2- Cytokine dysregulaion . •

3-Antigen share B-cell antigens cross react with self molecules. •

4-foreign antigen activate B-Cells &some of activated cells clones •

produce autoantibody& Cause autoimmune disease •



**Genetic factors may affect the •
induction of autoimmune disease and
this depends on:**

1-autoimmune within family. •

**2-different genetic factors that select •
the organ to be affected**

3-Certain HLA type specificities •



Pathogenesis •

The process of the autoimmune mechanism •
is pathogenic autoantibody found in the
serum, may be of three possibilities:

1-The auto antibody itself is responsible for •
producing the disease

2-There is an inflammatory process or a •
disease which cause a tissue damage & that
damage lead to producing of Autoantibody

3-There is a factor which produces both the •
disease &the Autoantibody



- Diagnosis autoimmune disease:** •
- General signs of autoimmune disease that may have diagnostic value include :** •
- 1-Elevated serum gamma globuline** •
 - 2-presence of autoantibodies** •
 - 3-Depress levels of serum complement** •
 - 4-Immune complex in serum** •
 - 5-lesion detected on biopsy (e.glomerular lesions) resulting from deposition of immune complexes.** •



Systemic Lupus Erythematosus (SLE)

- a chronic systemic autoimmune disease
- Complexes of anti-self antibodies and antigen deposit in, and cause damage to, tissue
- 1 million sufferers in the U.S.
- Strikes women nine times more often than men
- symptoms may include butterfly-shaped rash on face, fatigue, headaches
- triggered by environmental effects in persons who are genetically susceptible

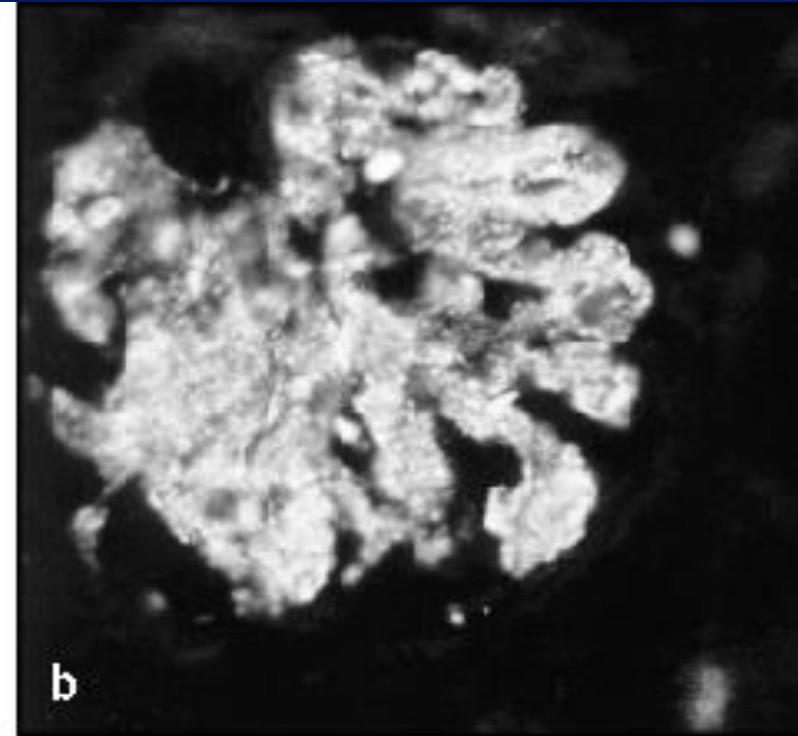
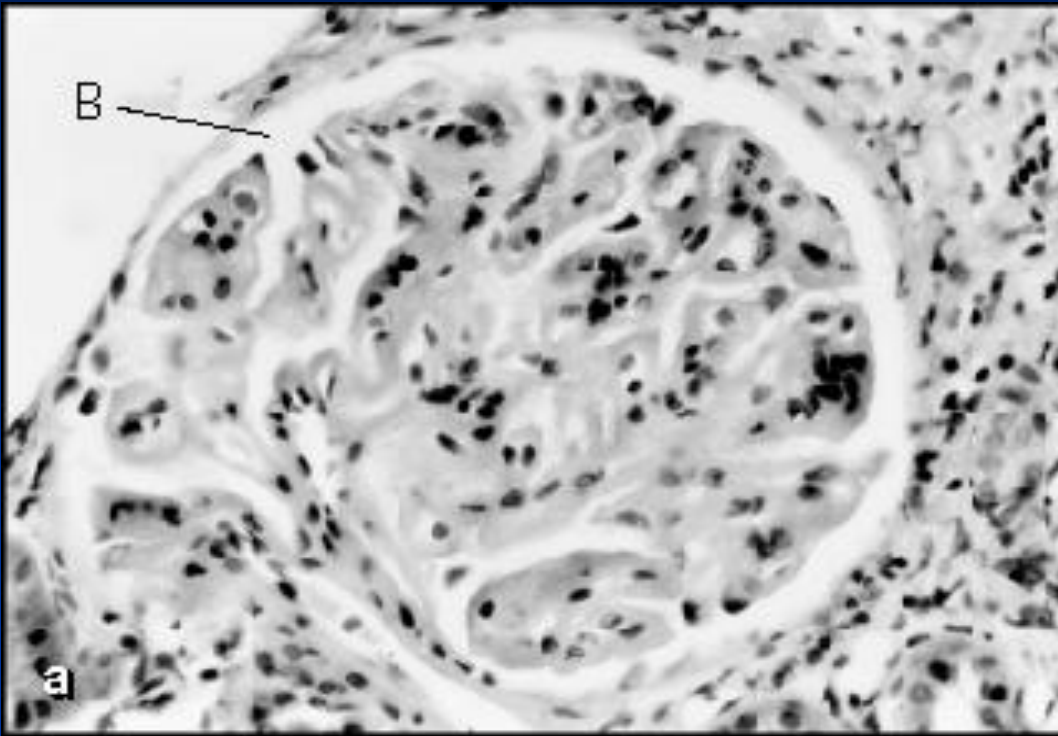


Butterfly rash of lupus



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Damaged kidney (left) caused by immunoglobulin deposits (right)



Rheumatoid Arthritis (RA)

X-ray shows severe arthritis affecting the joints and limiting mobility



Treatments for autoimmune diseases

- current treatments are based on easing disease symptoms
 - anti-inflammatory drugs to reduce the inflammatory response
 - cytotoxic drugs to kill immune cells
 - treatments that block interaction of immune cells – e.g.,
 - bind to cytokines, block second signals
 - replacement of necessary chemical – e.g., injections of insulin for diabetes
 - changes in diet
 - exercise
- in the future
 - gene therapy
 - vaccines to turn off the autoimmune response

- How can autoimmune disease produced** •
- This can be done by 3 mechanisms** •
- 1-When microbial antigen cross - react with cryptic self epitopes lead to auto reactive T-Cell.** •
 - 2-antigens sharing B- Cell epitopes cross react with self molecular this break tolerance but by a different mechanism.** •
 - 3- foreign antigen (e.g: LPS, E-B virus) cause direct B cell stimulation and some of the clones of these cells produce autoantibodies.** •



Auto-immune disease

- I- Immunologic factors
- II- Genetic factors
- III- Microbial factors

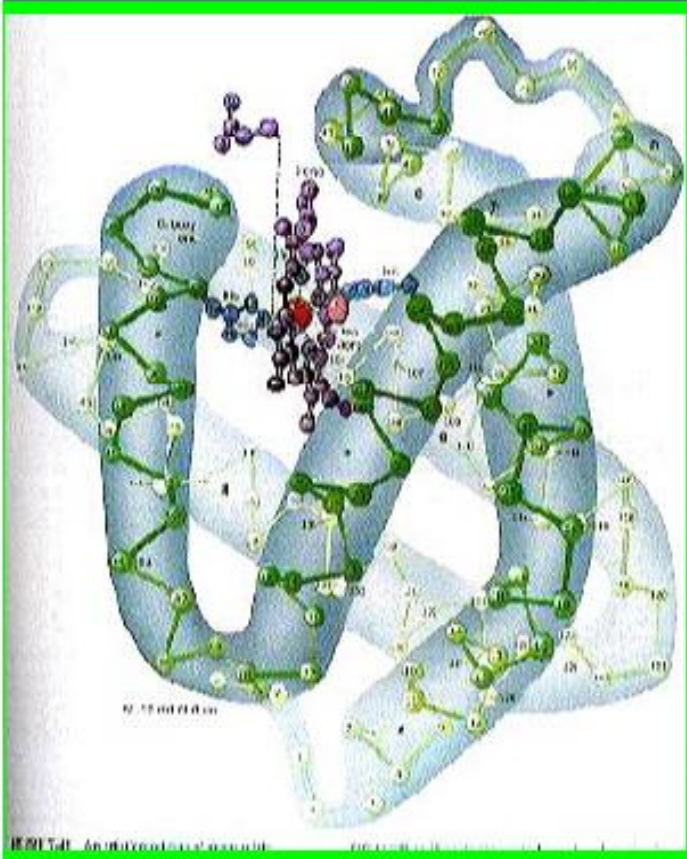
Autoimmune diseases

Mechanisms-

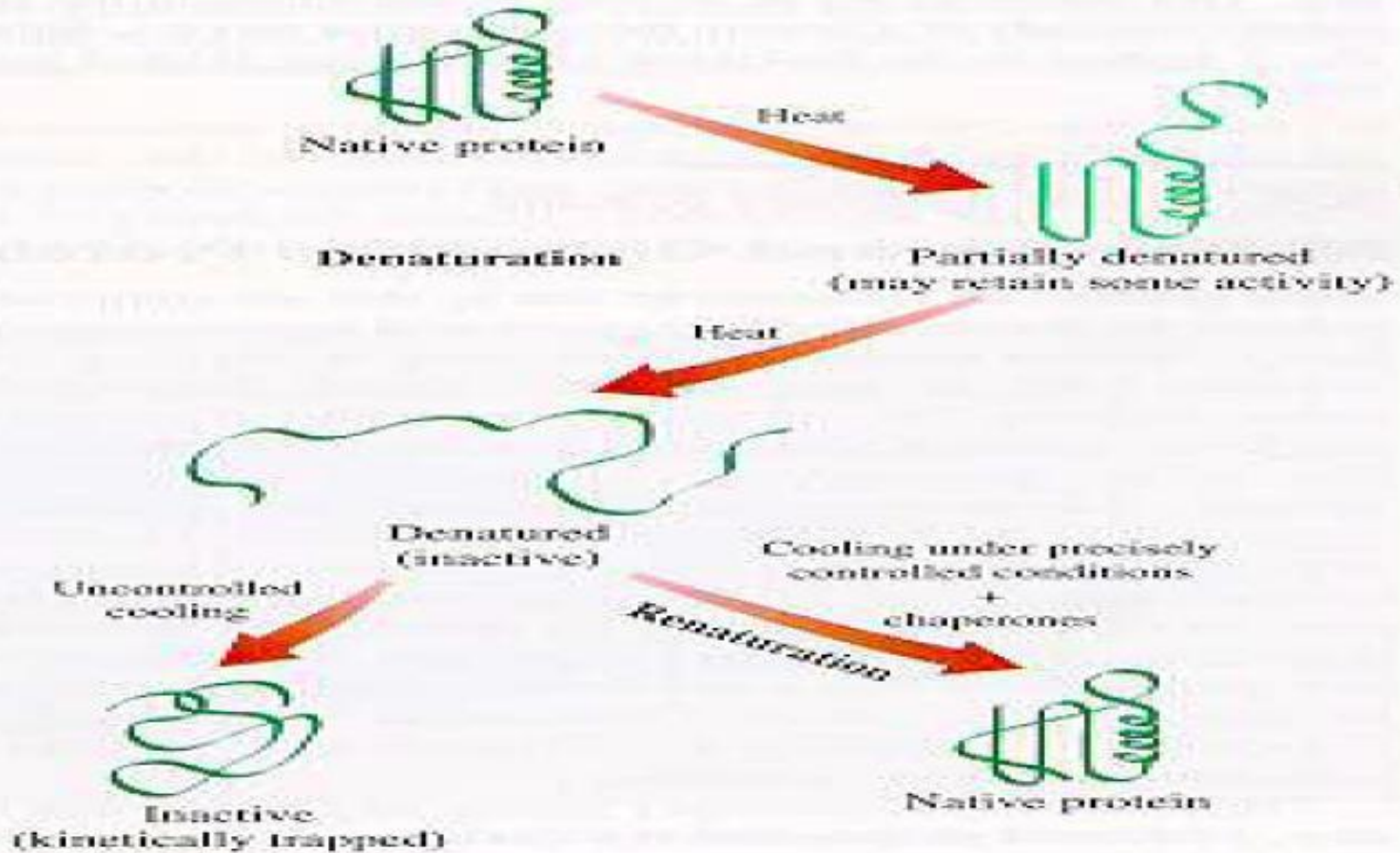
I –Immunologic factors

- Breakdown of T cell anergy
- Failure of T cell mediated suppression
- Molecular mimicry
- Polyclonal B cell activation
- Release of sequestered Ags
- Exposure of cryptic self and epitope spreading

Epitope spreading-Protein structure



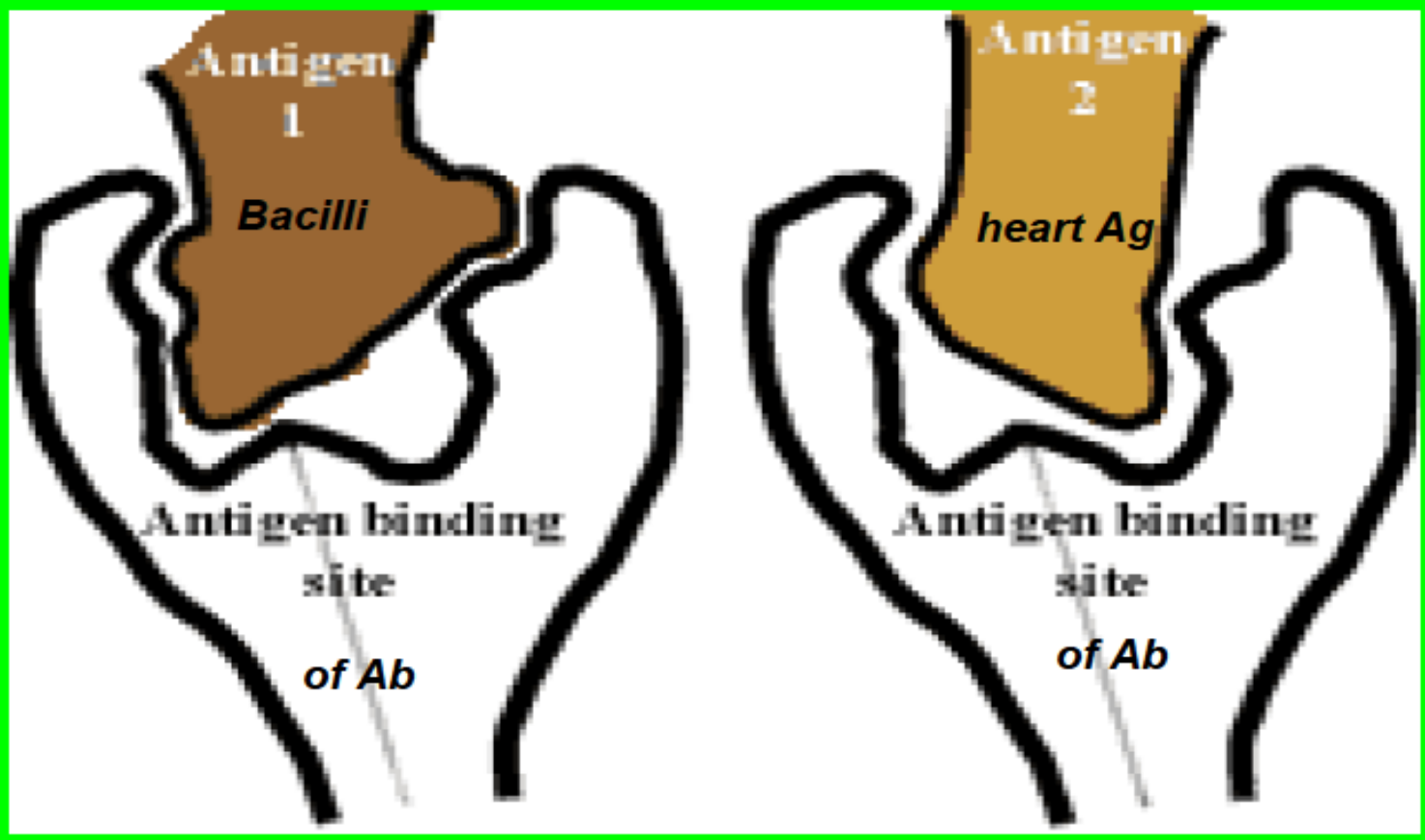
Protein epitopes



Sequestered Ags-Sperms



Molecular mimicry *(eg. rheumatic fever)*



The •

End •

