



**Departamento de Imunologia  
Instituto de Ciências Biomédicas  
Universidade de São Paulo**

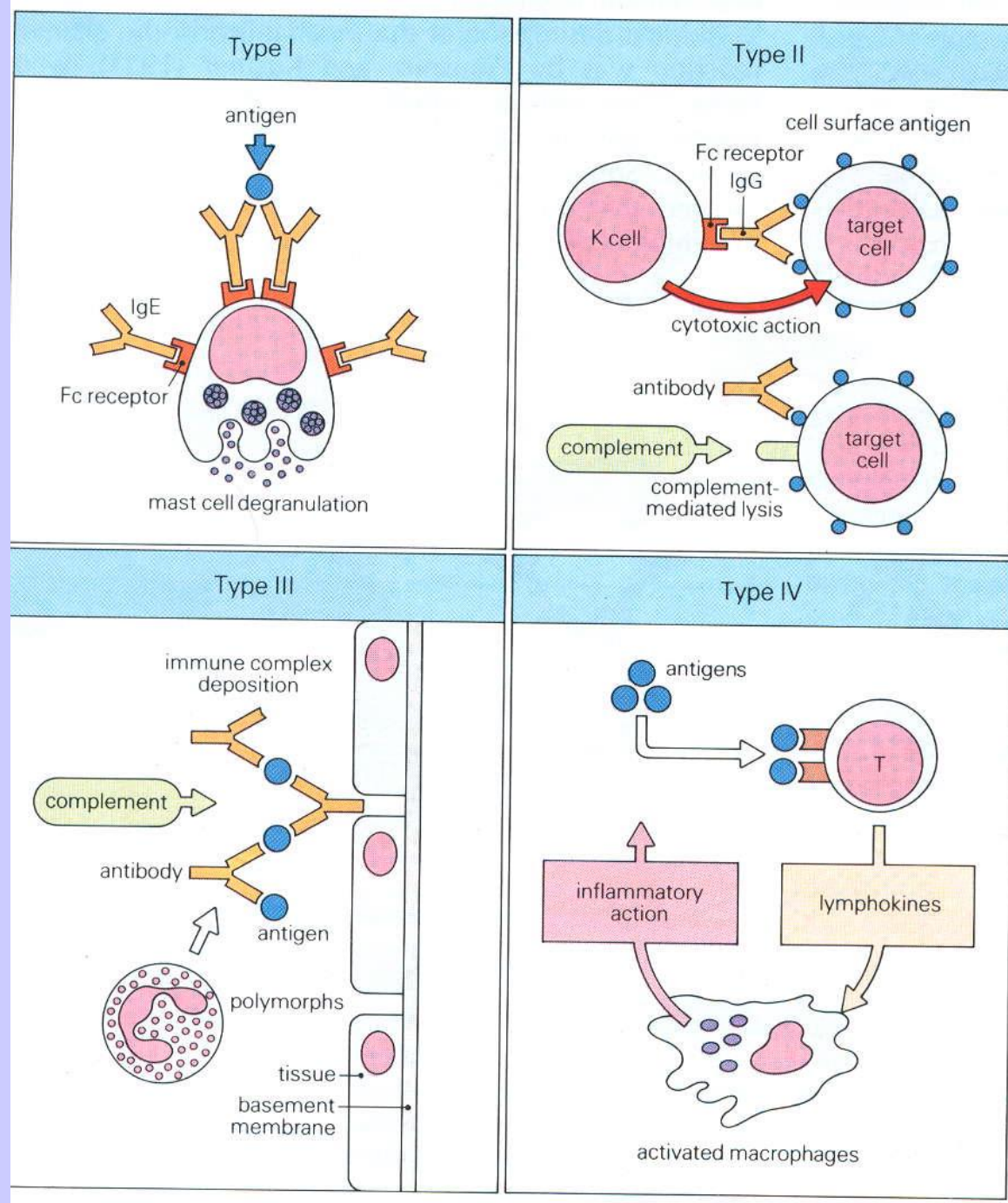
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# **Hipersensibilidades**

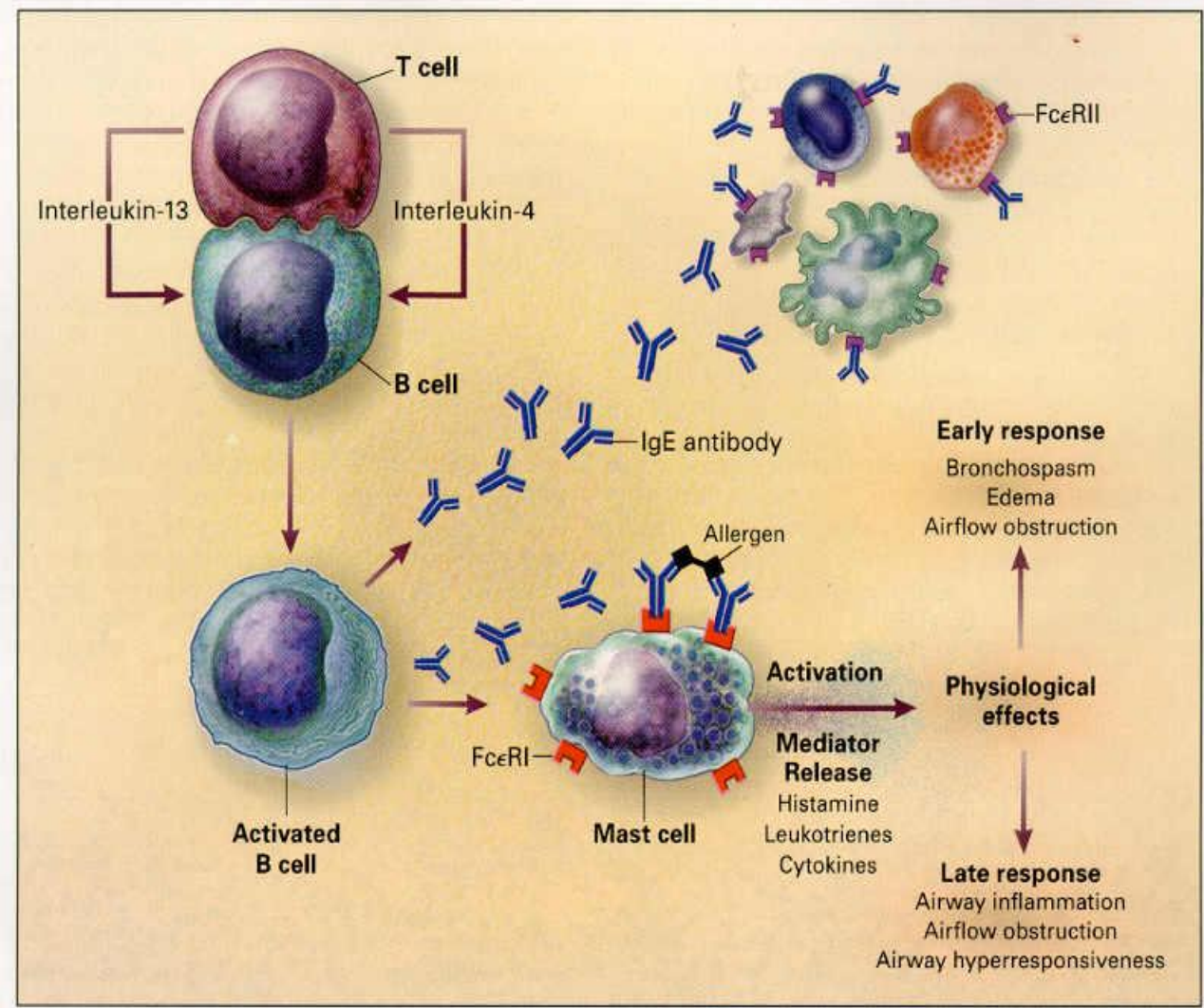
**Prof. Dr. Antonio Condino Neto  
Professor Titular**

# Hipersensibilidade

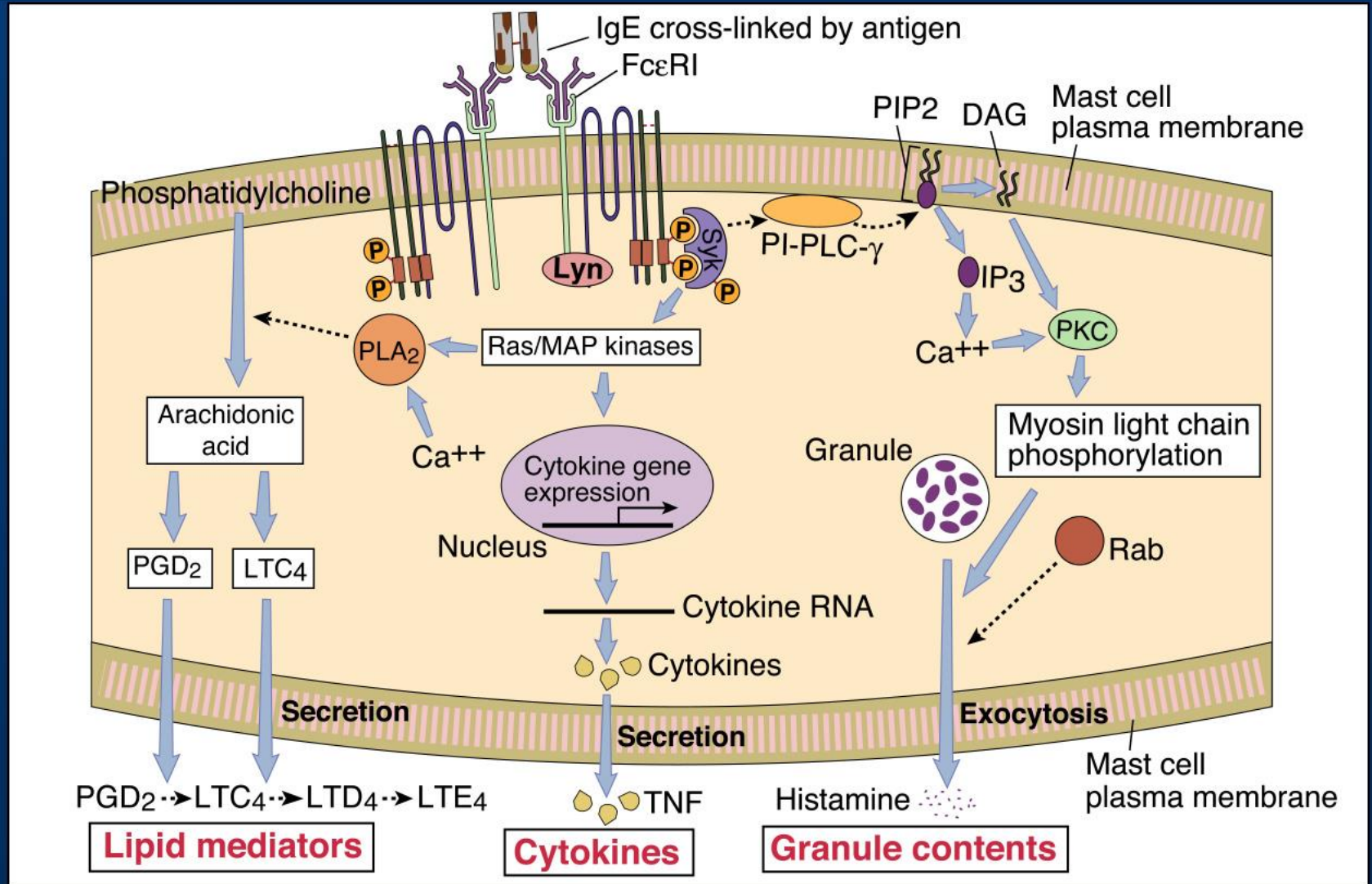
## Dano tecidual imunologicamente mediado



# Interações B e T para Síntese de IgE



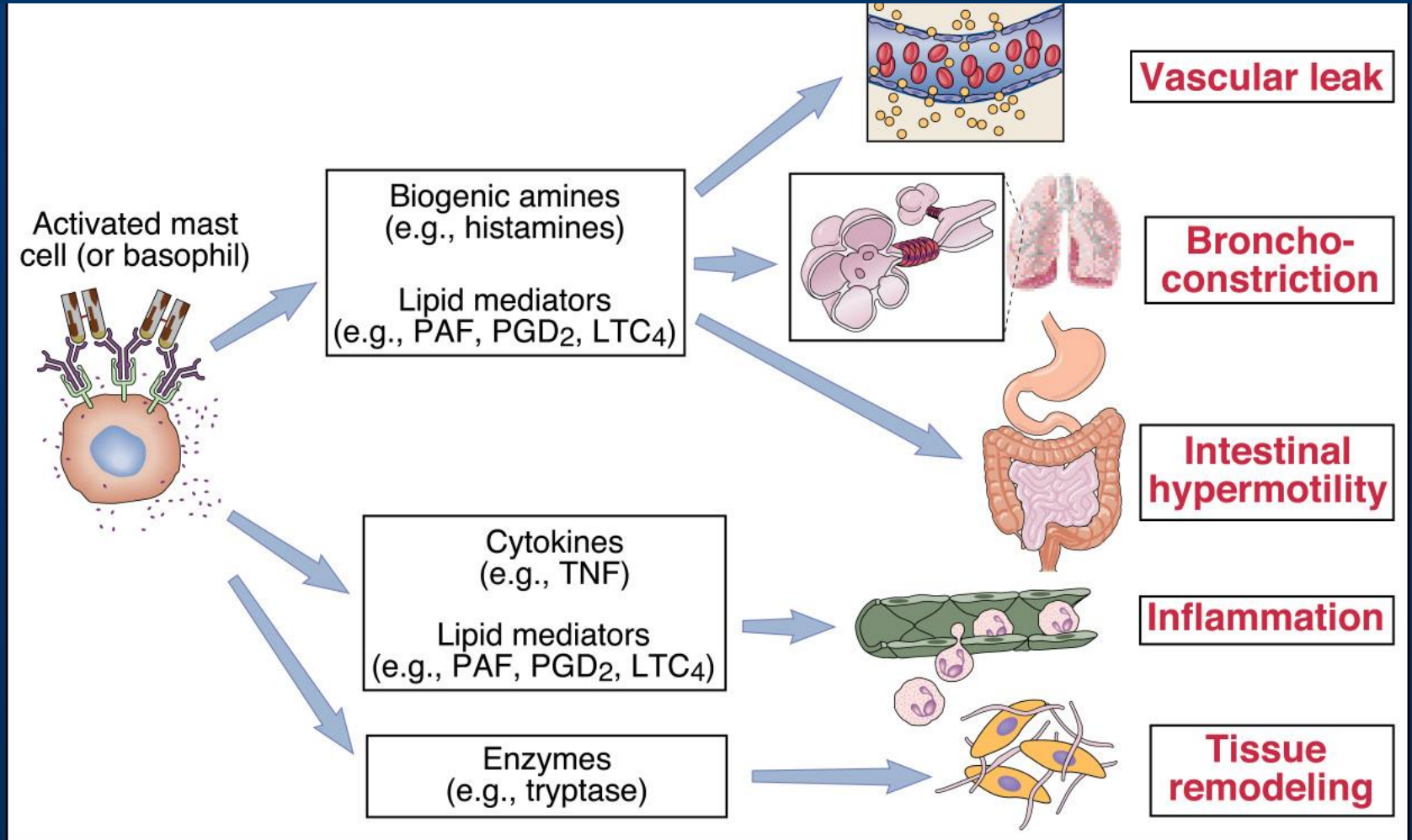
# Ativação do mastócito



From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 19-7



# Mediadores dos mastócitos



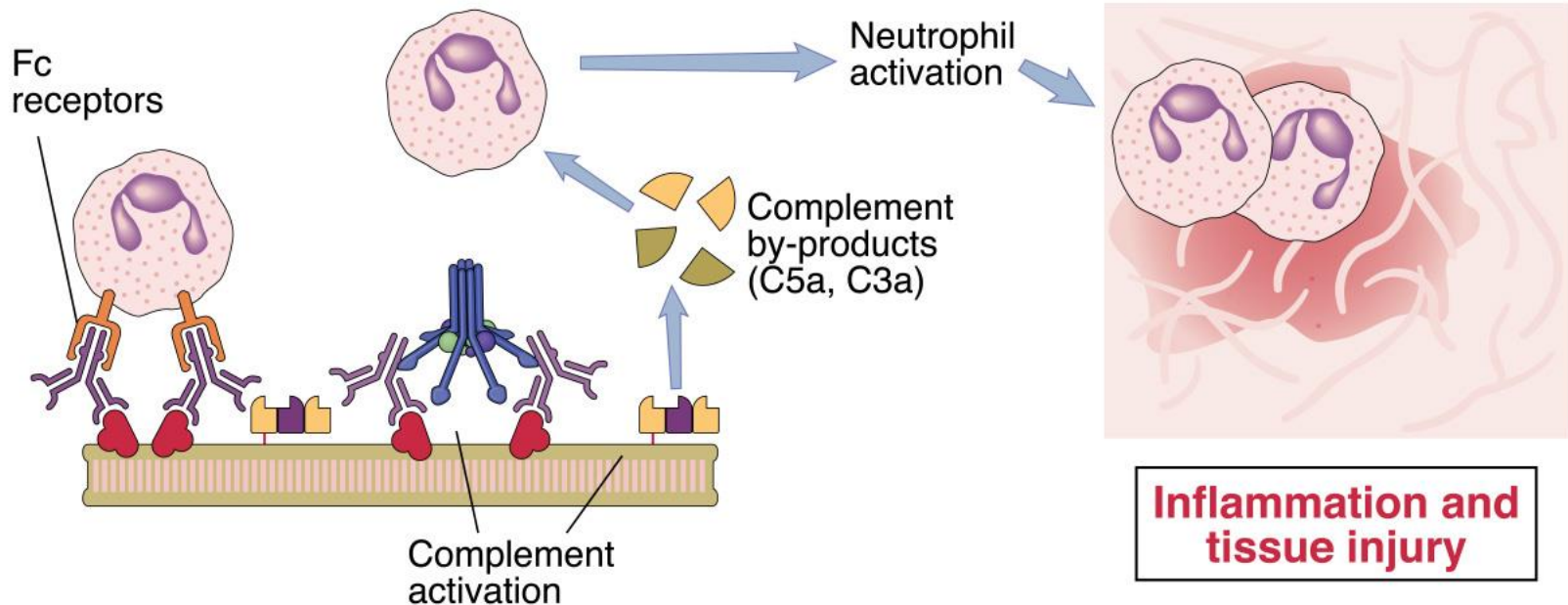
From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 19-8a

# Hipersensibilidade tipo II

- Anticorpos dirigidos contra a superfície de células alvo ou antígenos teciduais interagem com moléculas do sistema complemento e danificam tais células ou tecidos circunjacentes.

# Mecanismos efetores de doenças mediadas por anticorpos

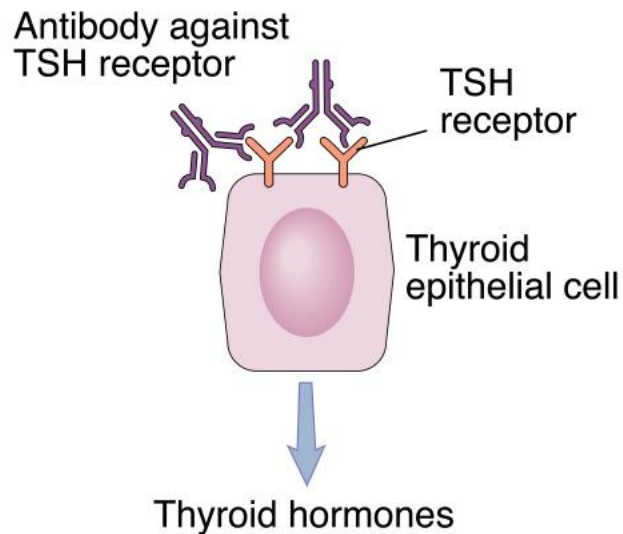
## Ⓑ Complement- and Fc receptor–mediated inflammation



From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 18-2b

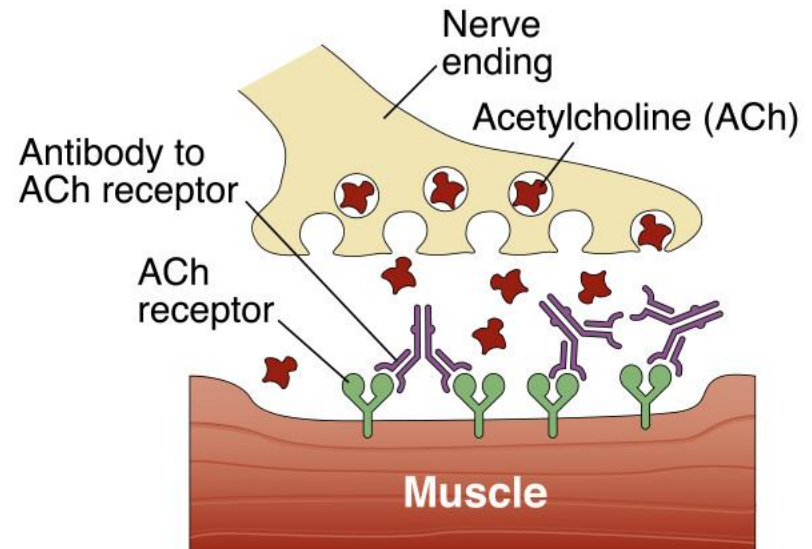
# Mecanismos efetores de doenças mediadas por anticorpos

## Ⓒ Abnormal physiologic responses without cell/tissue injury



**Antibody stimulates receptor without ligand**

**HIPERTIREOIDISMO**



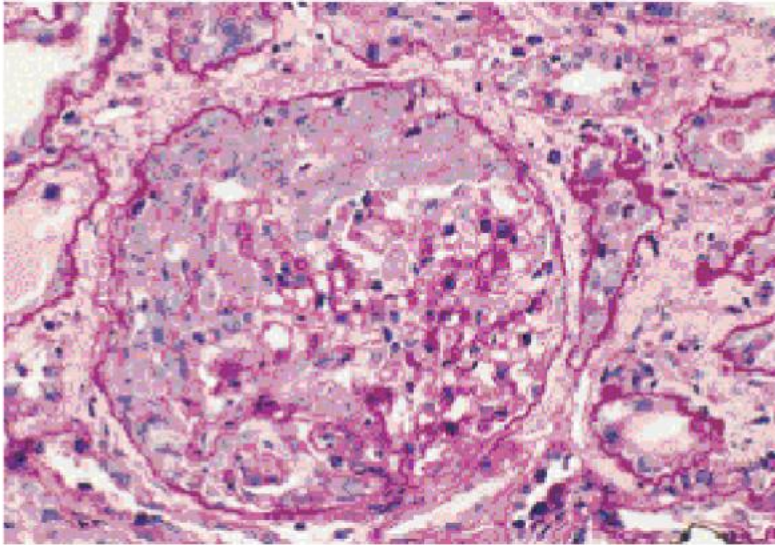
**Antibody inhibits binding of ligand to receptor**

**MIASTENIA**

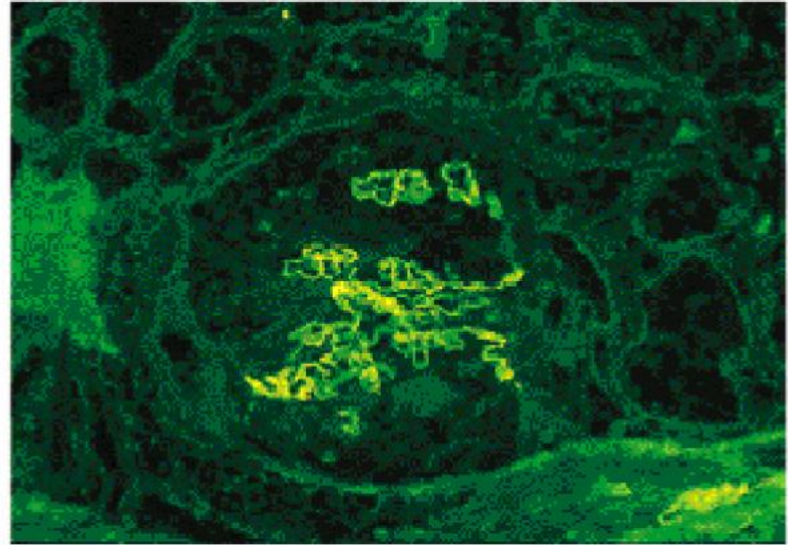


# Glomerulonefrite: anticorpos anti-membrana basal

Light microscopy



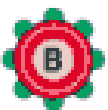






Immunofluorescence



From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 18-3b

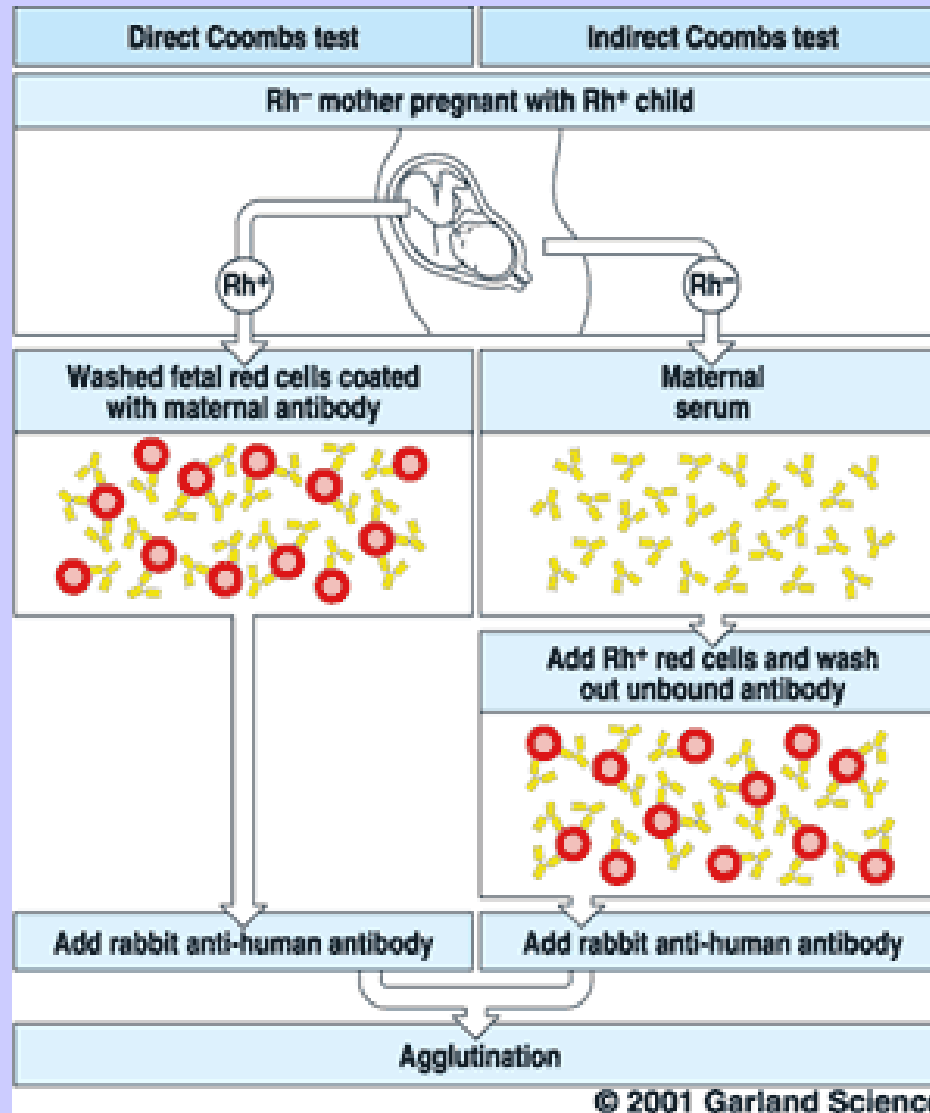
# Reação Ag x Ac

	Red blood cells from individuals of type		Red blood cells from individuals of type	
				
	Express the carbohydrate structures		Express the carbohydrate structures	
Serum from individuals of type	R-GlcNAc-Gal   Fuc	R-GlcNAc-Gal-GalNAc   Fuc	R-GlcNAc-Gal-Gal   Fuc	R-GlcNAc-Gal-GalNAc   Fuc + R-GlcNAc-Gal-Gal   Fuc
 Anti-A and anti-B antibodies	no agglutination	agglutination	agglutination	agglutination
 Anti-B antibodies	no agglutination	no agglutination	agglutination	agglutination
 Anti-A antibodies	no agglutination	agglutination	no agglutination	agglutination
<b>AB</b> No antibodies to A or B	no agglutination	no agglutination	no agglutination	no agglutination

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- **Aglutinação:** Ag está na superfície de uma bactéria, célula do sangue, levedura ou partícula

# Reação Ag x Ac

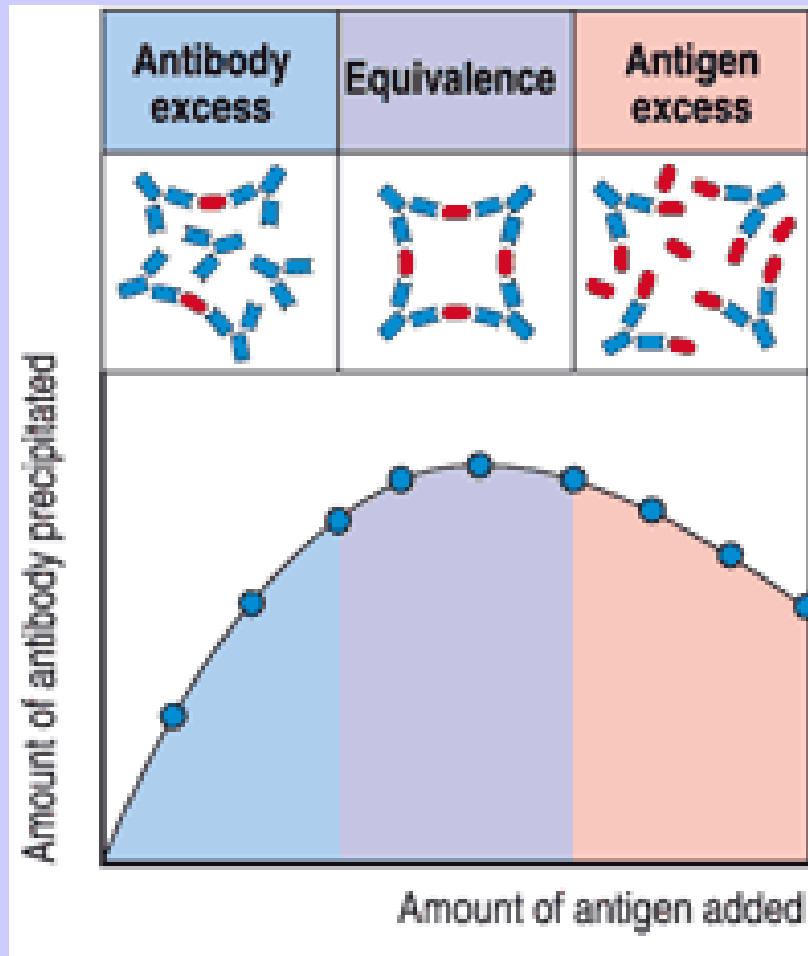


# Hipersensibilidade tipo III

- Resulta da formação de imunocomplexos que se depositam e ativam mecanismos inflamatórios:
- Infecção persistente
- Autoimunidade
- Antígenos ambientais



# Imunocomplexos – Deposição



Articulações

Vasos sanguíneos

Rins - glomérulos

**Clearance pelos fagócitos**

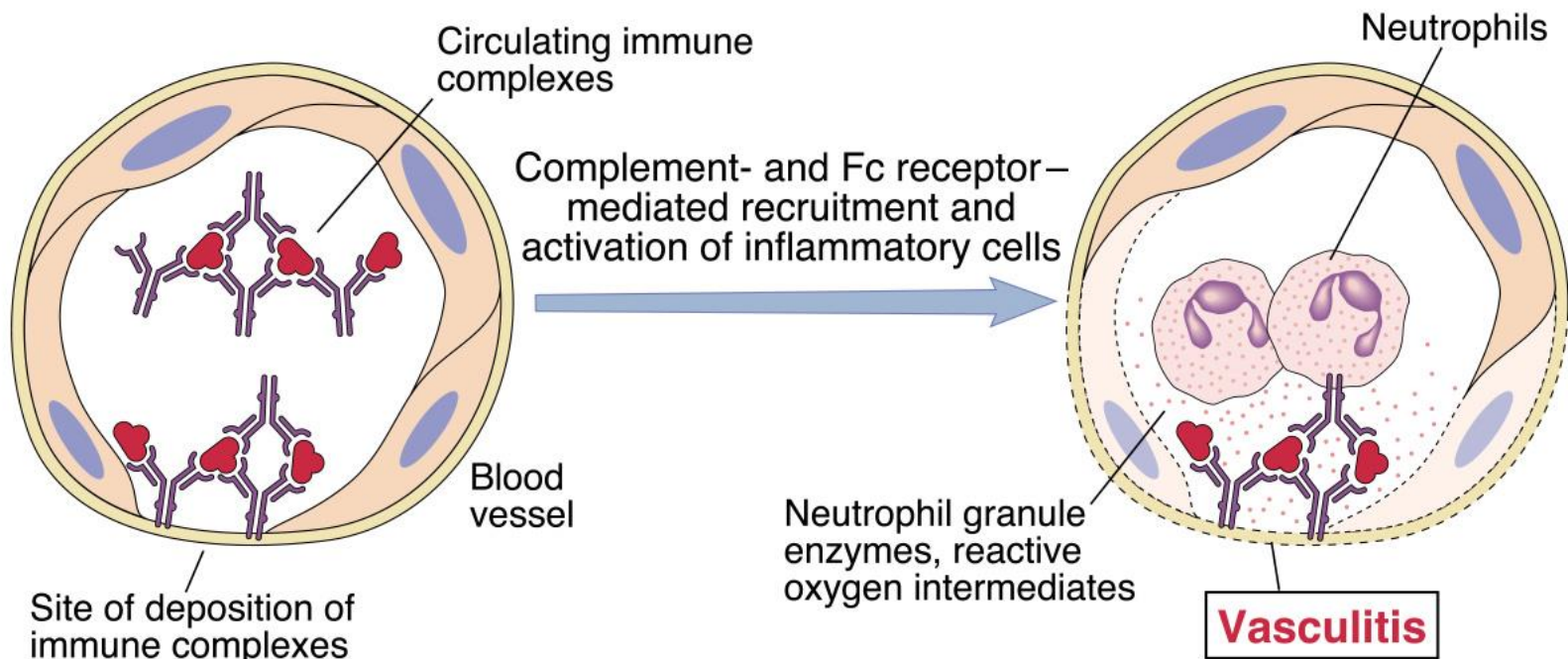


# Dano tecidual causado por imunocomplexos

## (A) Immune complex-mediated tissue injury

Mechanism of antibody deposition

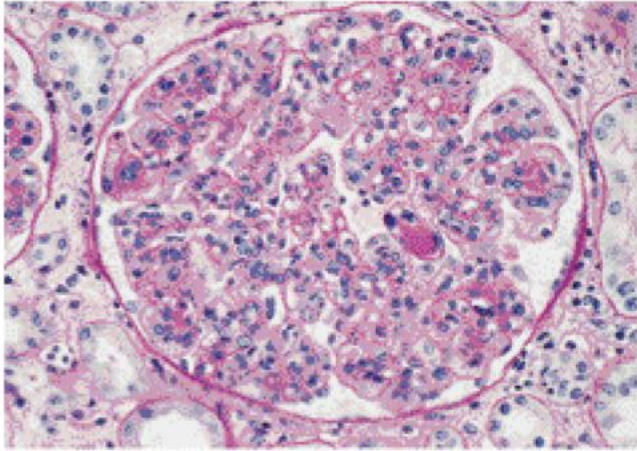
Effector mechanisms of tissue injury



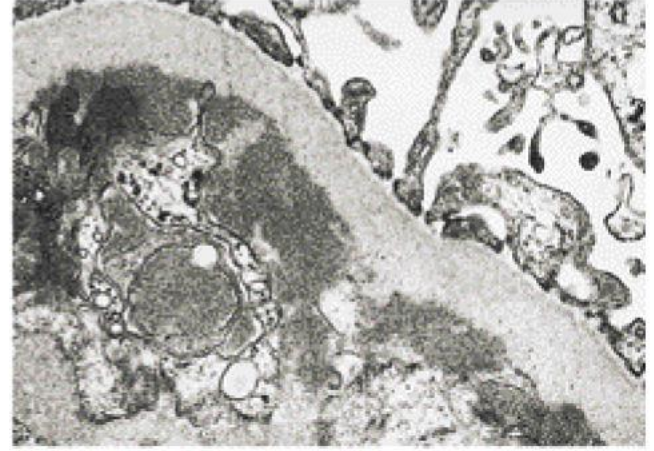
From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 18-1a

# Glomerulonefrite mediada por imunocomplexos

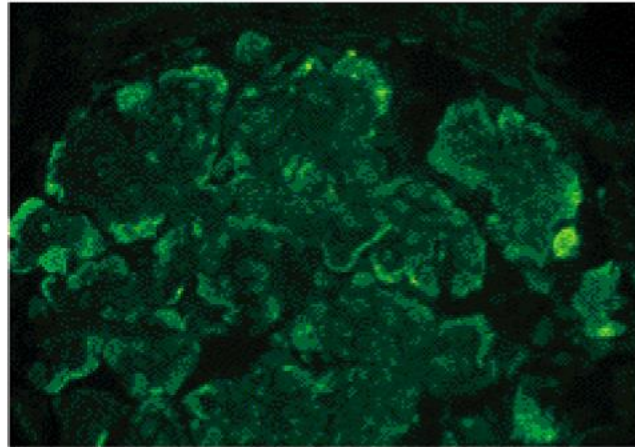
Light microscopy



Electron microscopy

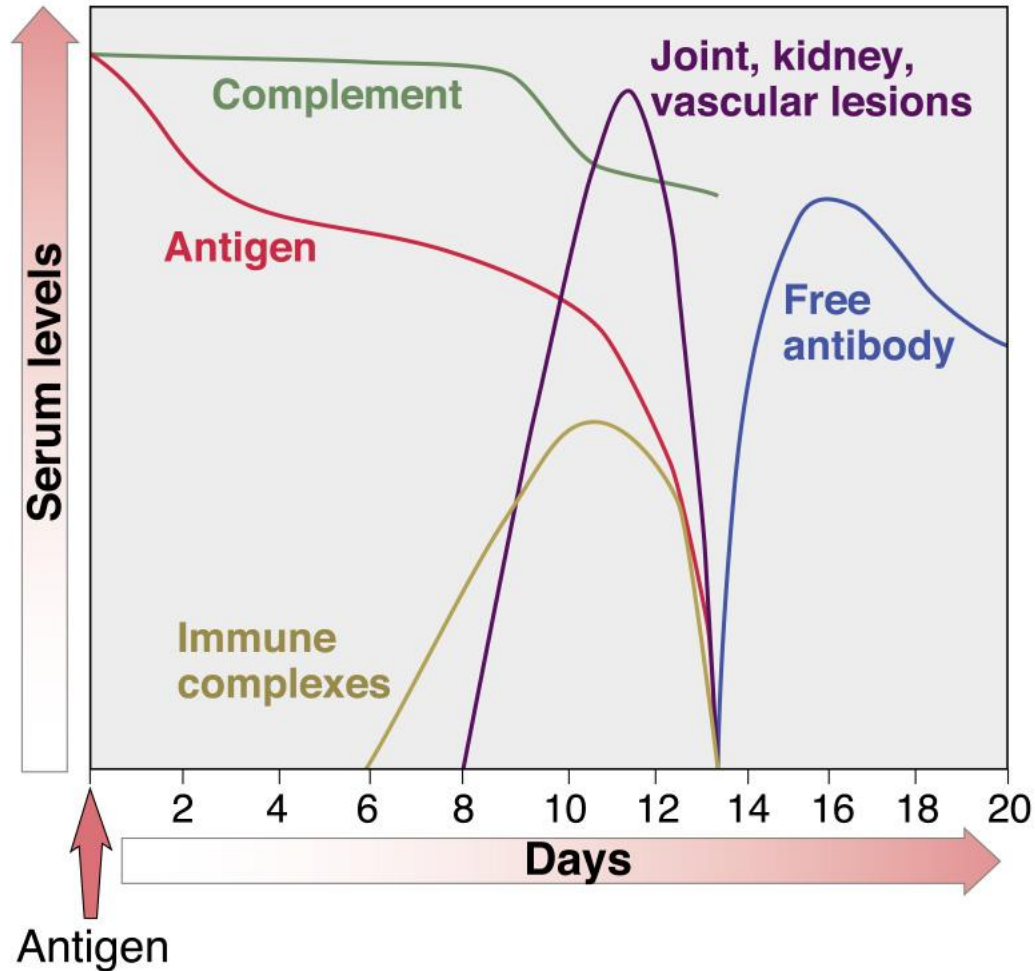


Immunofluorescence



From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 18-3a

# Doença do soro aguda

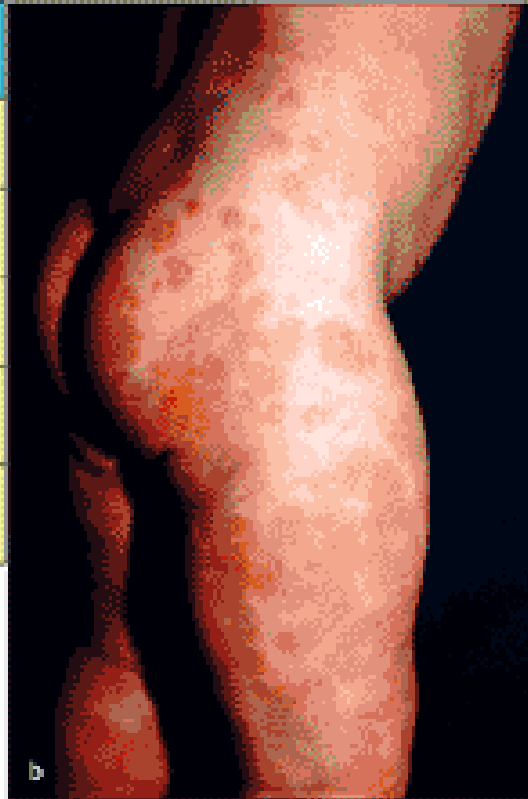


From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 18-4



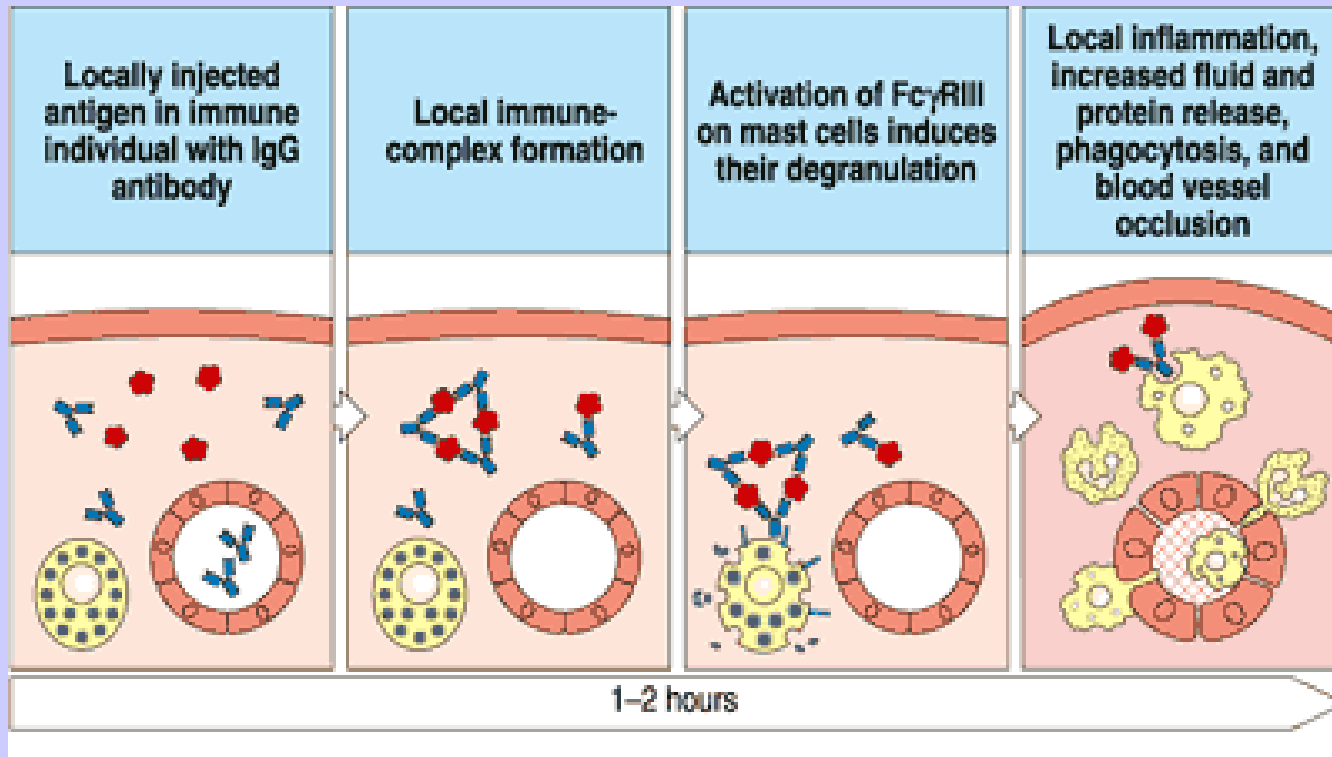
# Doença do soro

Route	Resulting disease	Site of immune-complex deposition
Intravenous (high dose)	Vasculitis	Blood vessel walls
	Nephritis	Renal glomeruli
	Arthritis	Joint spaces
Subcutaneous	Arthus reaction	Perivascular area
Inhaled	Farmer's lung	Alveolar-capillary interface



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# Reação de Arthus

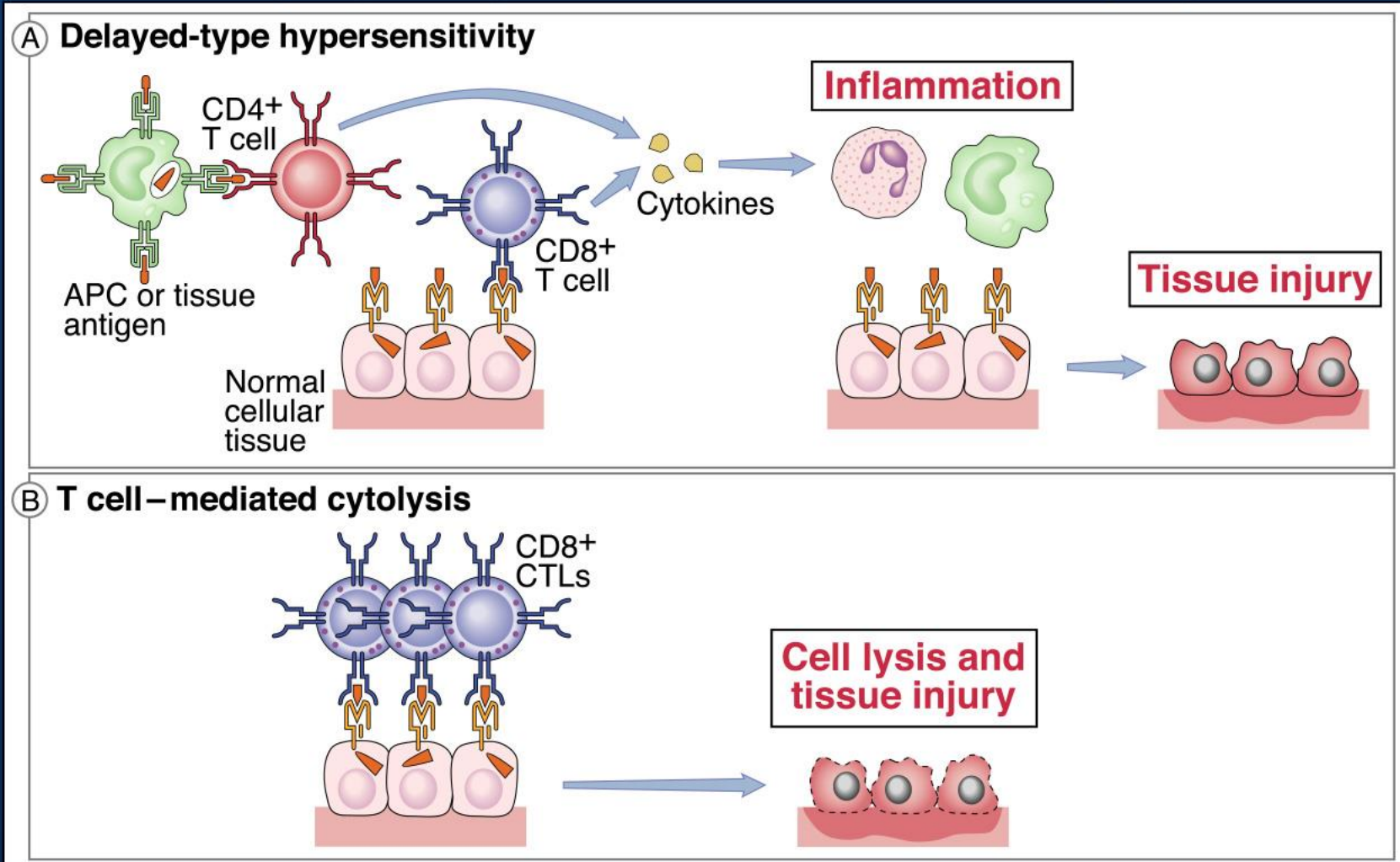


Imunocomplexos subcutâneos

# Hipersensibilidade tipo IV

- Reação inflamatória predominante de linfócitos e macrófagos, podendo assumir a forma de um infiltrado celular ou granulomas.
- Contato
- Tuberculina
- Granuloma

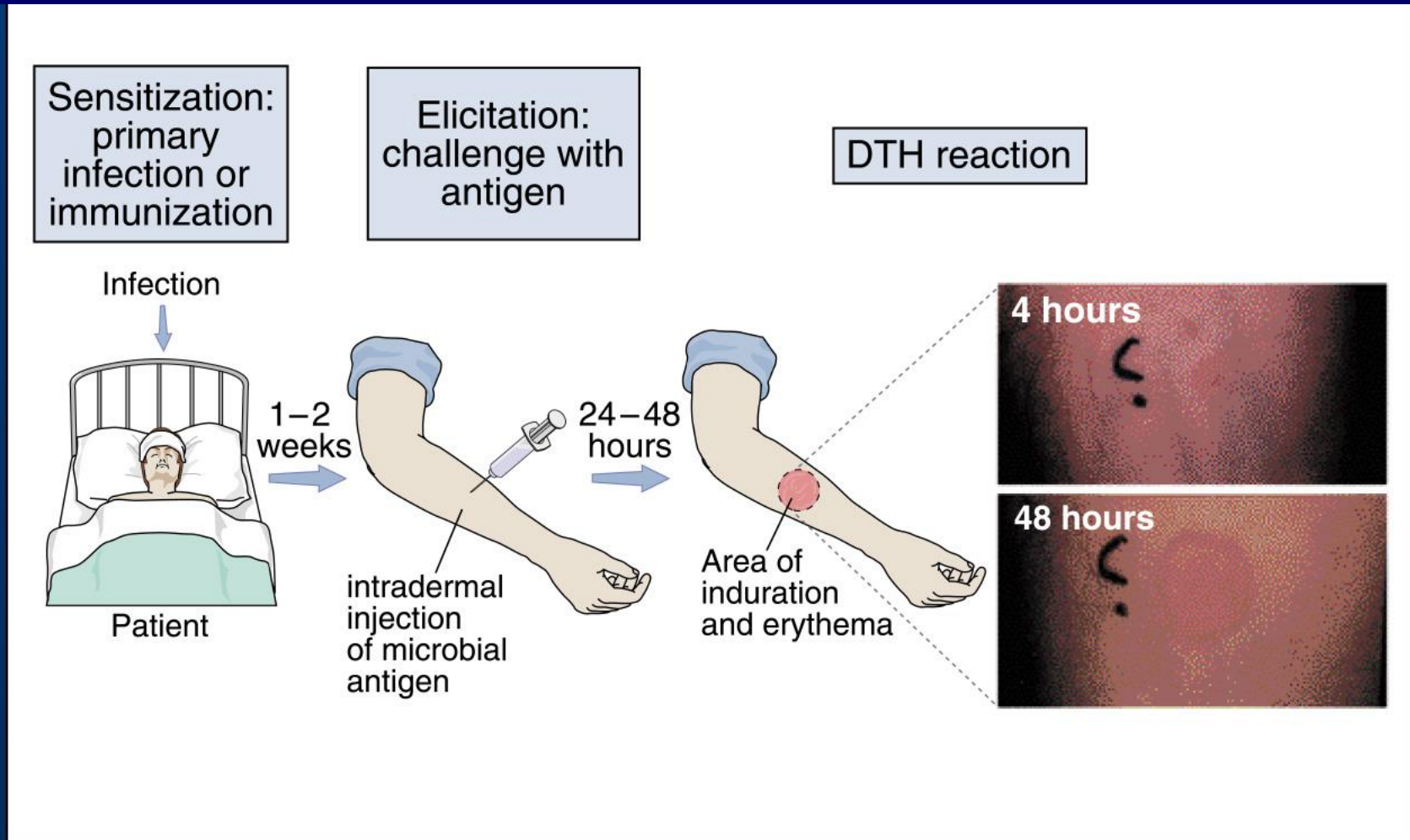
# Mecanismos de dano tecidual mediado por linfócitos T



From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 18-5

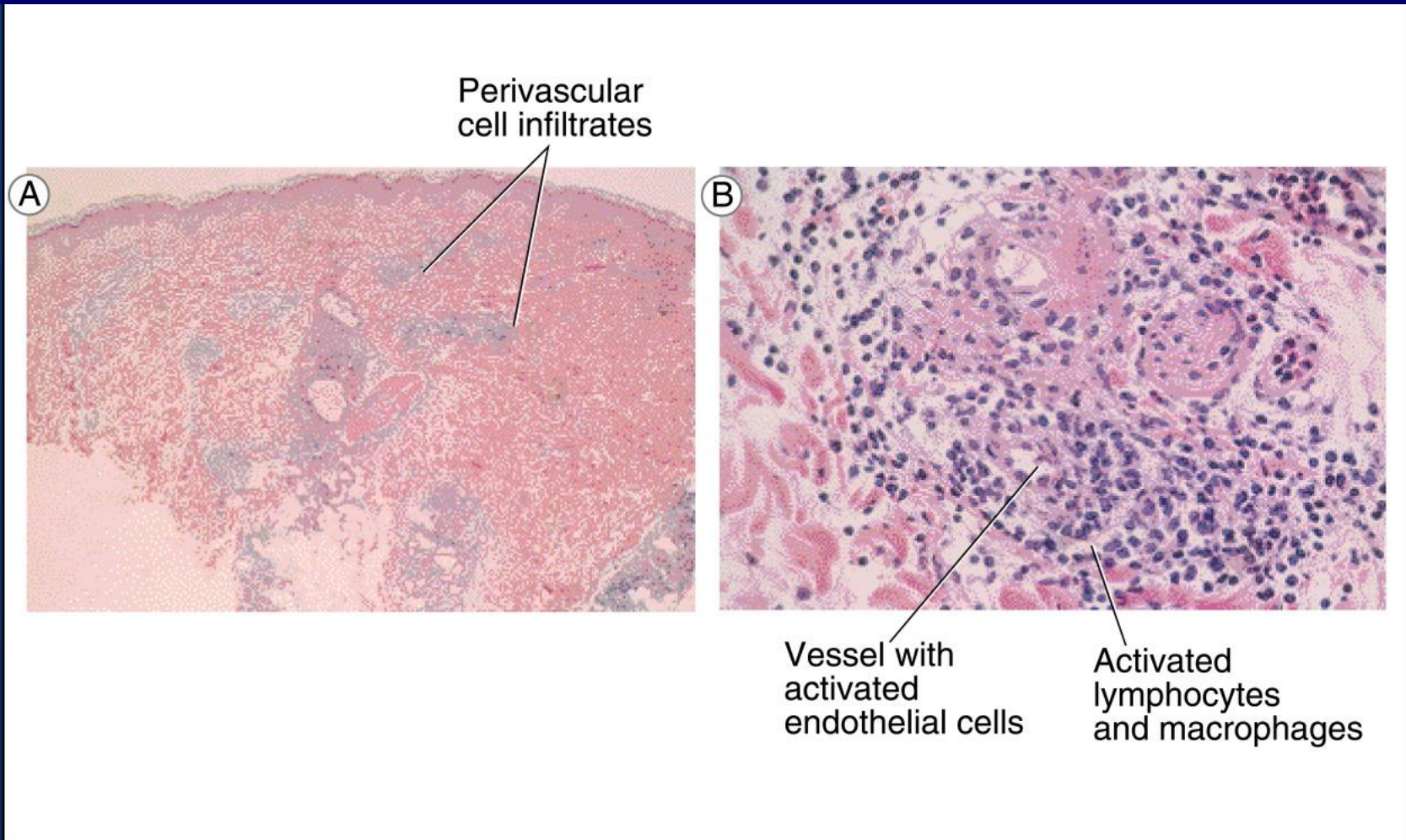


# Reação de hipersensibilidade retardada - DTH



From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 13-3

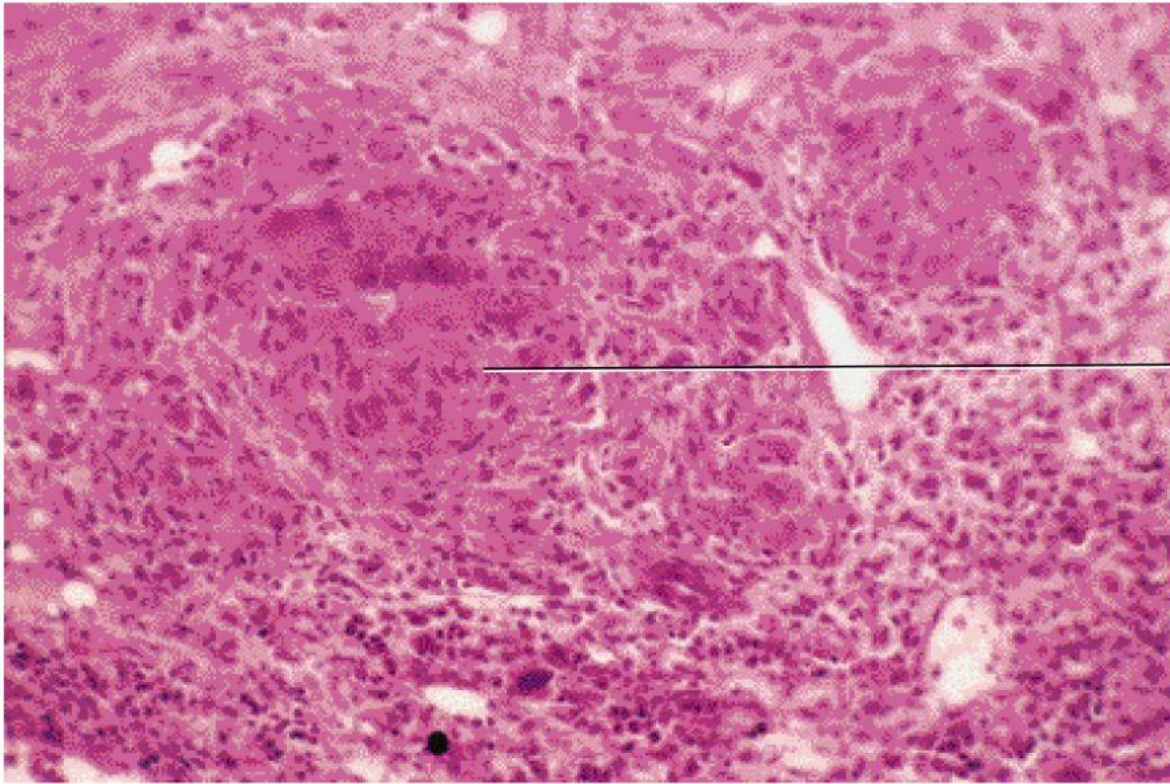
# Reação de hipersensibilidade retardada - DTH



From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 13-4



# Granuloma



Activated  
macrophages

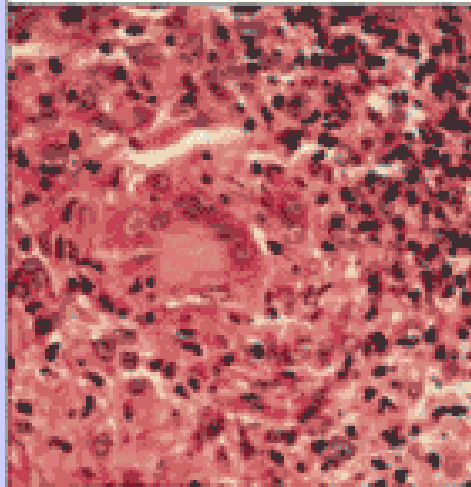
From Abbas, Lichtman, & Pober: Cellular and Molecular Immunology. W.B. Saunders, 1999, Fig. 13-9

# DTH - Hanseníase

Infection with *Mycobacterium leprae* can result in different clinical forms of leprosy

There are two polar forms, tuberculoid and lepromatous leprosy, but several intermediate forms also exist

**Tuberculoid leprosy**



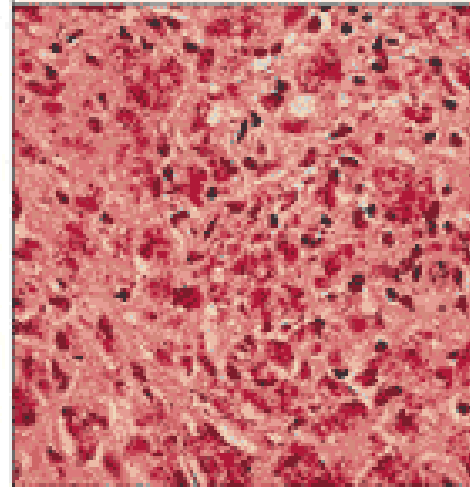
Organisms present at low to undetectable levels

Low infectivity

Granulomas and local inflammation.  
Peripheral nerve damage

Normal serum immunoglobulin levels

**Lepromatous leprosy**



Organisms show florid growth in macrophages

High infectivity

Disseminated infection. Bone, cartilage, and diffuse nerve damage

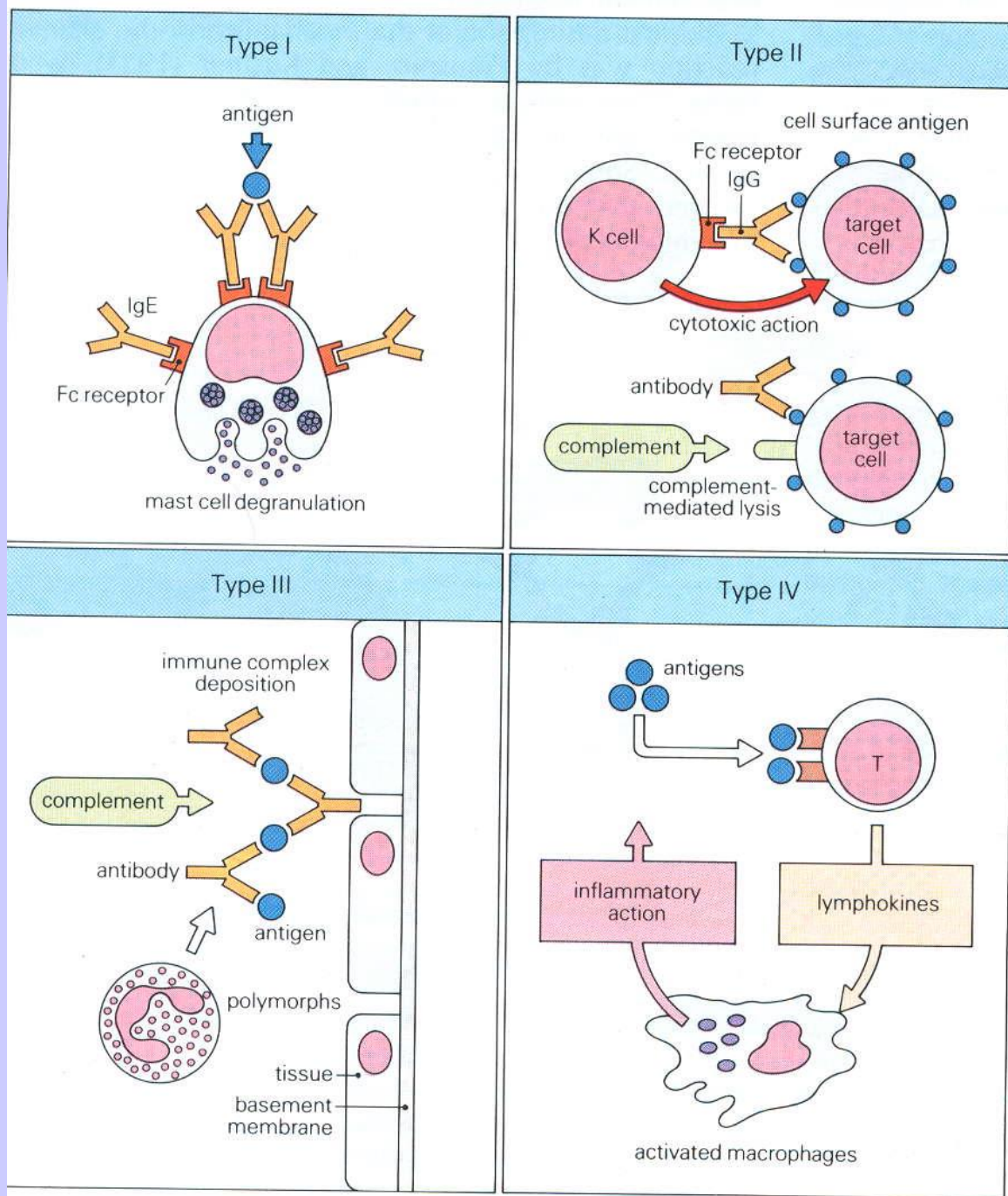
Hypergammaglobulinemia



# Hipersensibilidade

## Dano tecidual imunologicamente mediado

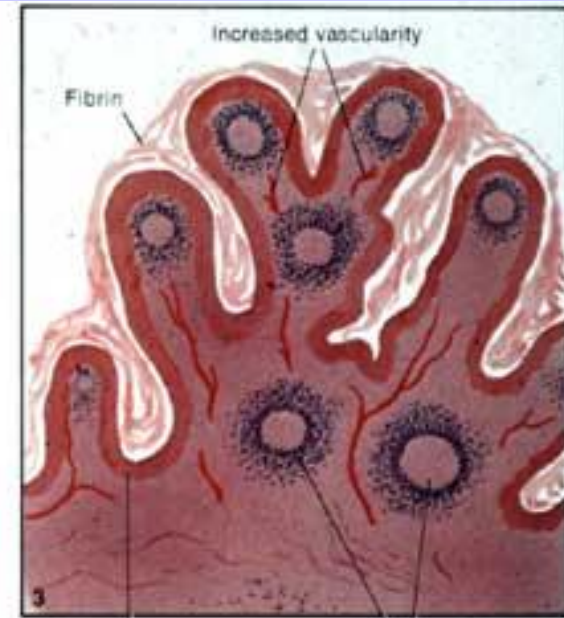
### MESCLA DE MECANISMOS



# Artrite Reumatóide



Lymphocytes and plasma cells and mast cells



Papillary synovium with synovial cell hyperplasia

Nodules of lymphocytes and plasma cells

# DERMATITE DE CONTATO

- **CONCEITO**
- A dermatite de contato é uma inflamação da pele, caracterizada na maioria das vezes por eczema, oriundo da exposição direta a substâncias do meio ambiente.

# DERMATITE DE CONTATO

- **Pode ser classificada em:**
- **Irritativa** - corresponde a 80% dos casos. Pode ocorrer com qualquer indivíduo, sendo causada por agentes irritantes que, em altas concentrações, extraem a camada lipídica da pele, ocasionando queimadura ou necrose.

# DERMATITE DE CONTATO

- **Pode ser classificada em:**
- **Alérgica** - corresponde a 20% dos casos. Ocorre somente em indivíduos geneticamente predispostos, sendo causada basicamente por haptenos. Mesmo em baixas concentrações, são capazes de promover inflamação cutânea.

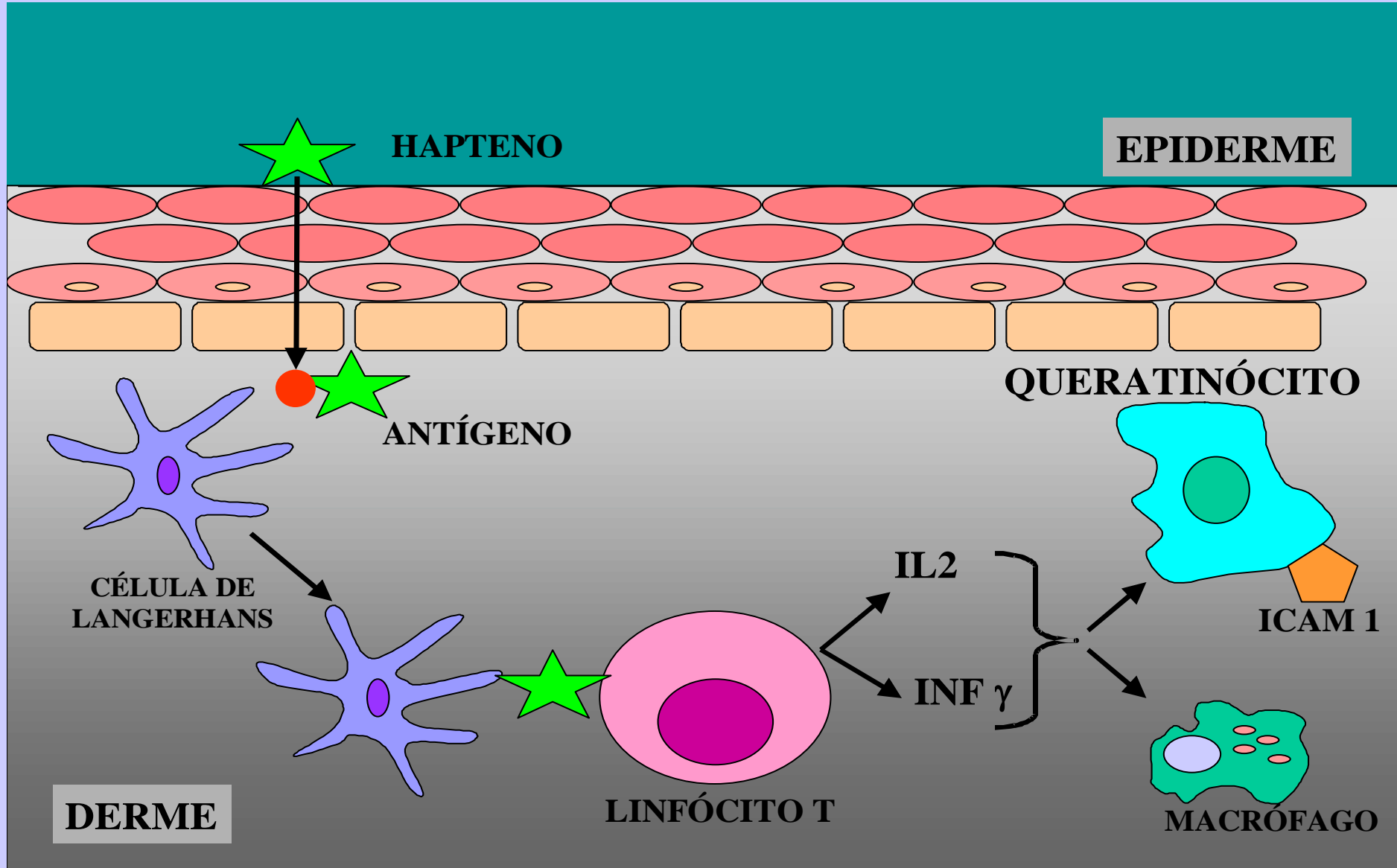
# DERMATITE DE CONTATO

- **Fisiopatologia**
- **Alérgica** - trata-se de uma reação de hipersensibilidade tipo IV de Gell e Coombs. Pode ser dividida em:
  - **(I) Fase de sensibilização ou indução**
  - **(II) Fase de elicitação**

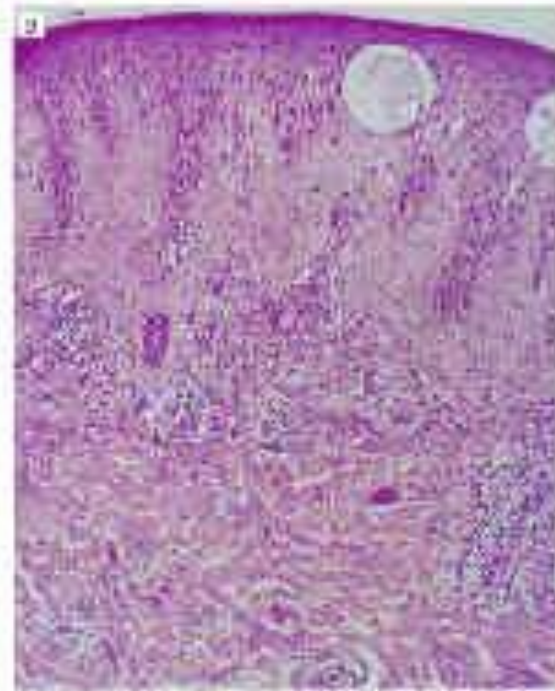


# DERMATITE DE CONTATO

## Fisiopatologia da Dermatite de Contato



# Dermatite de Contato

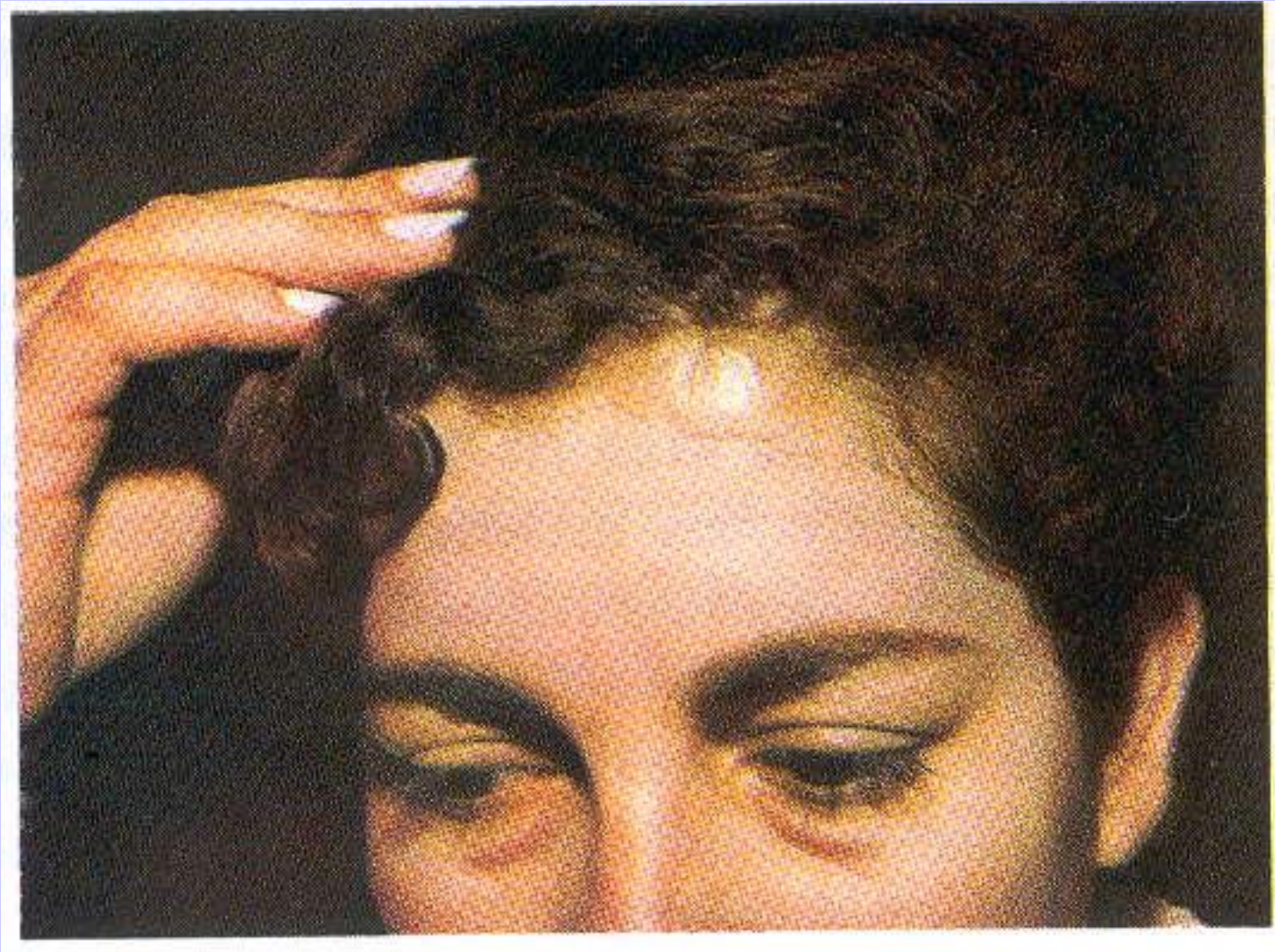


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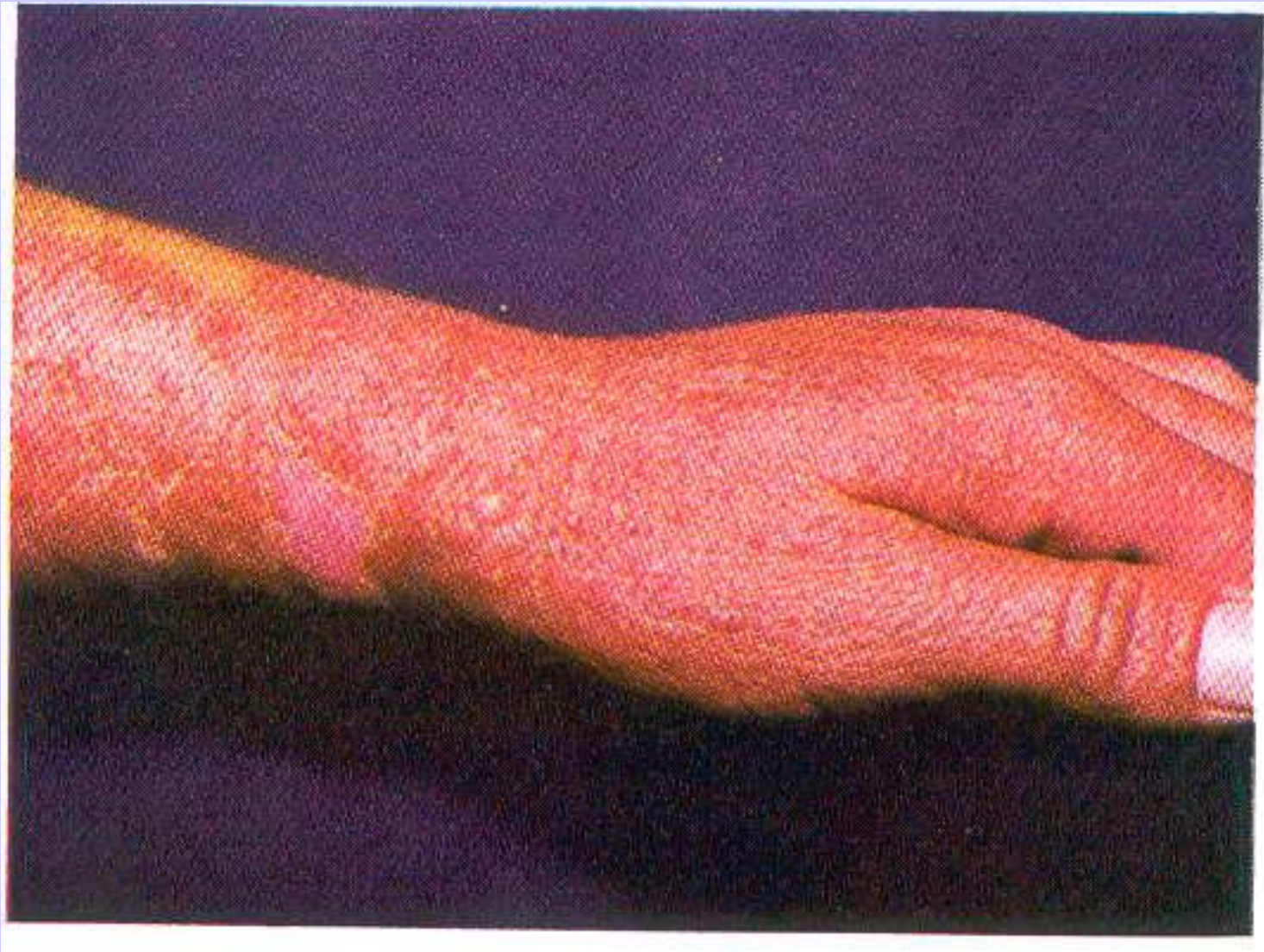


# Dermatite de Contato





# Dermatite de Contato



# Dermatite de Contato





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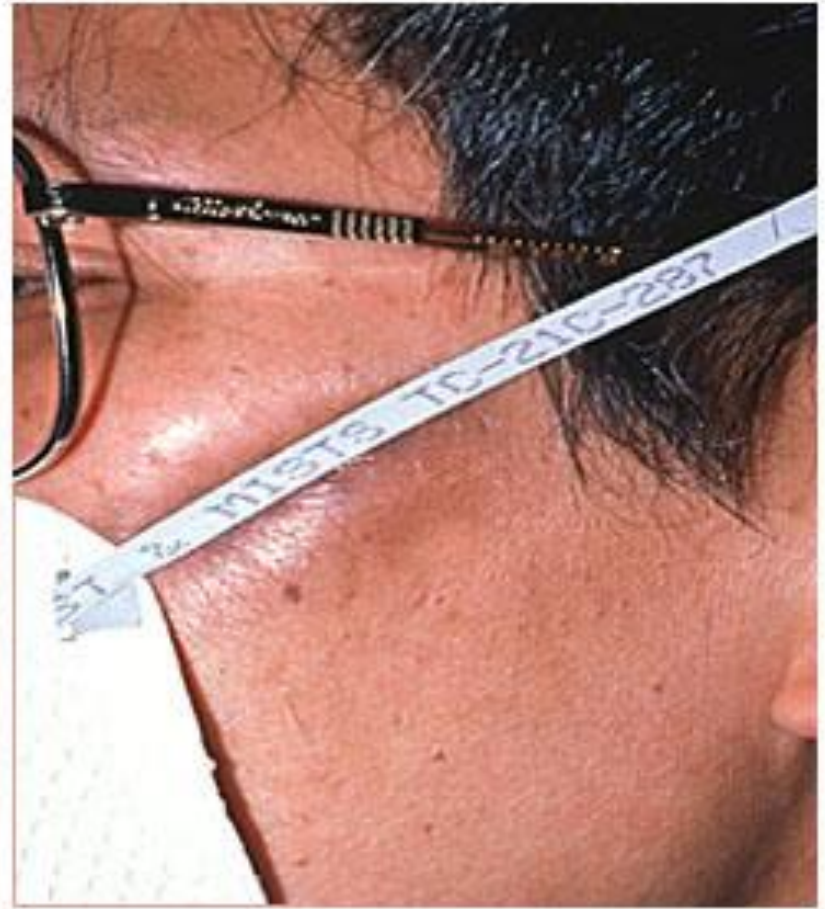
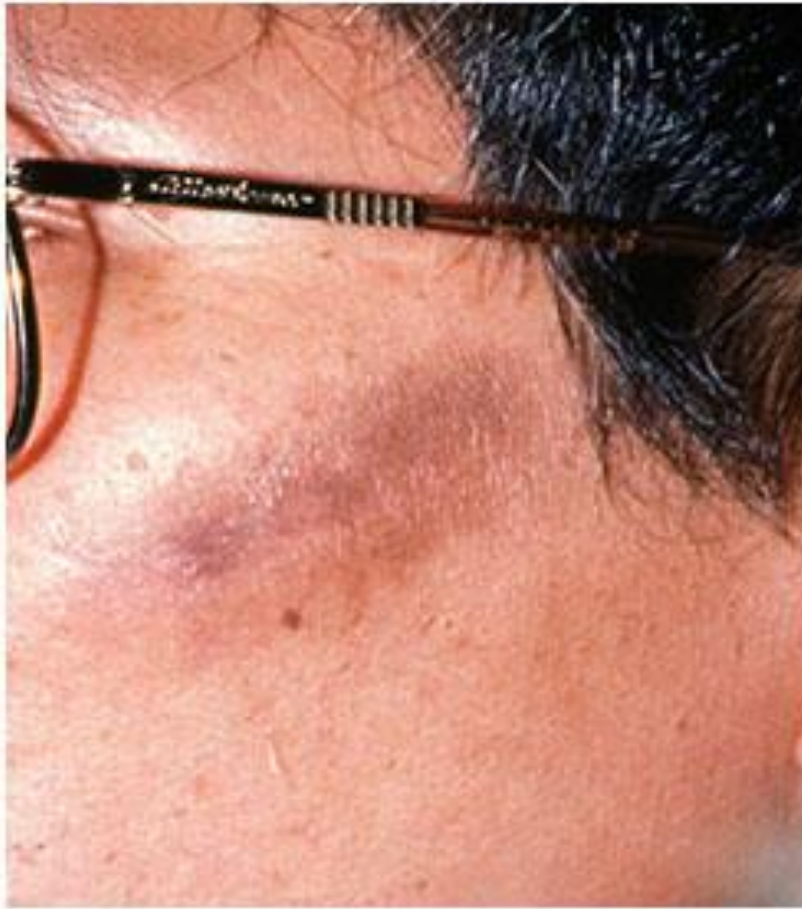




# Dermatite de Contato



# Dermatite de Contato



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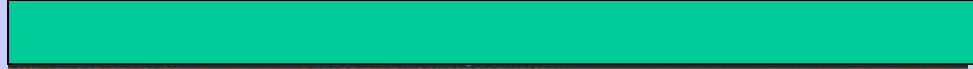


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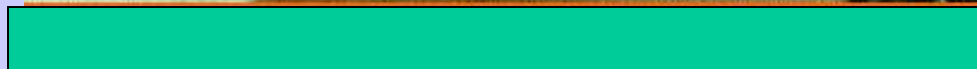
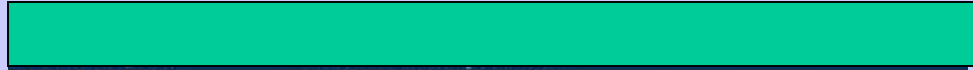


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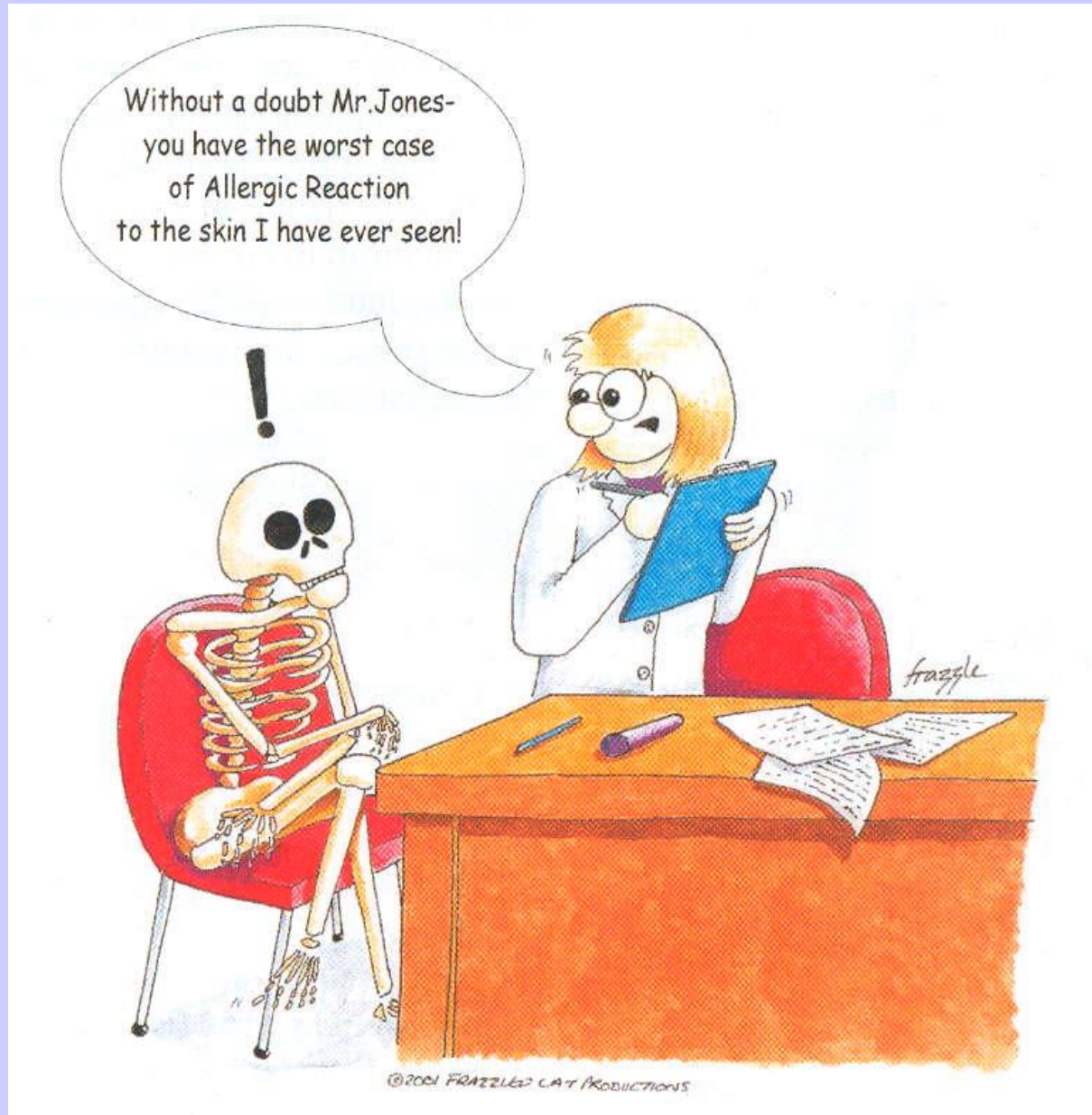
# Dermatite de Contato



# Dermatite de Contato



# Dermatite de Contato



# Grupo Brasileiro de Imunodeficiências



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