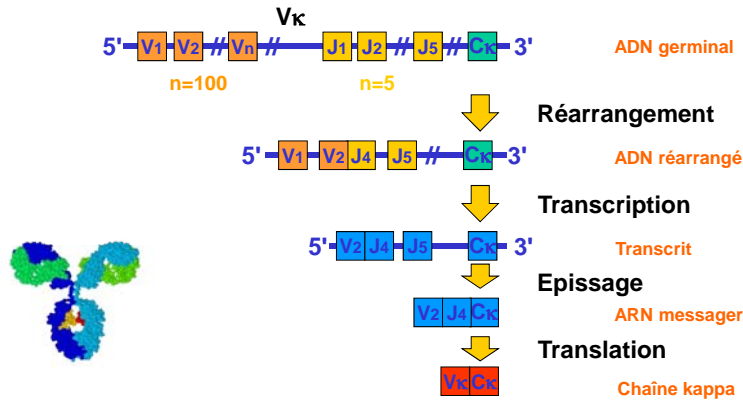


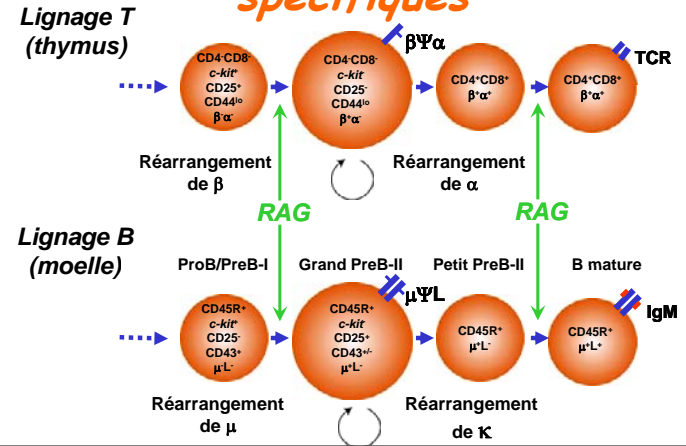




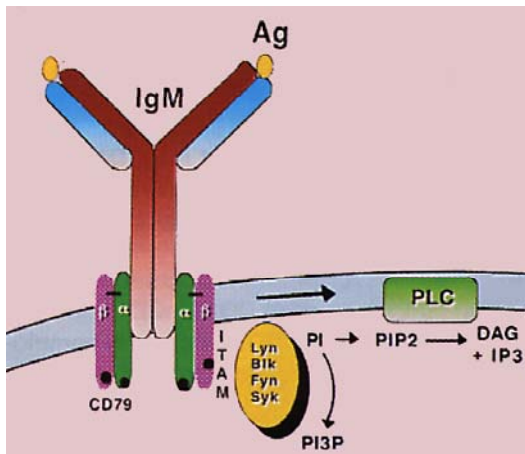
## Réarrangements des Chaînes K



## Acquisition des récepteurs spécifiques

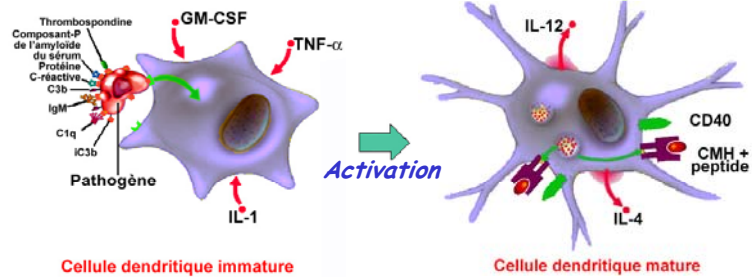


## Récepteur (BCR)

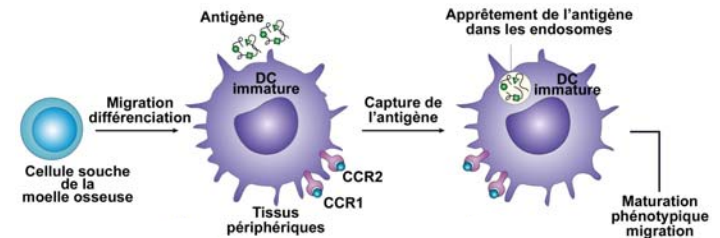


*Le scénario de la réponse immunitaire*

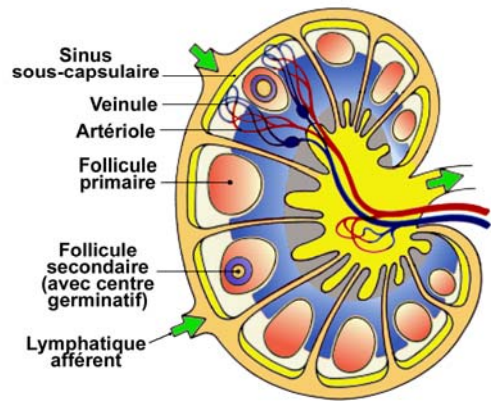
## Capture de l'antigène par les cellules dendritiques



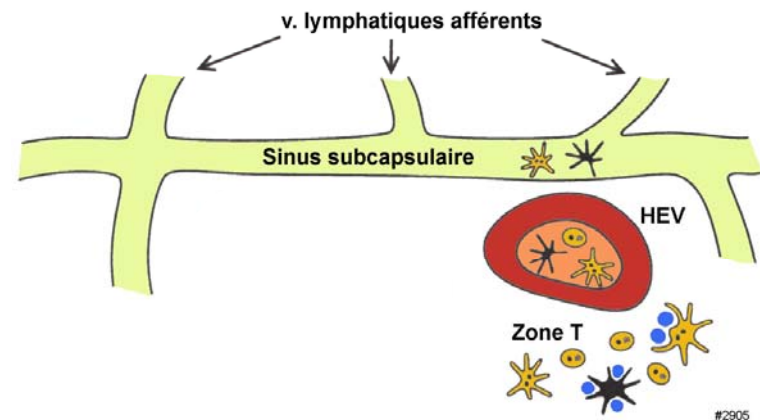
## Activation des cellules dendritiques

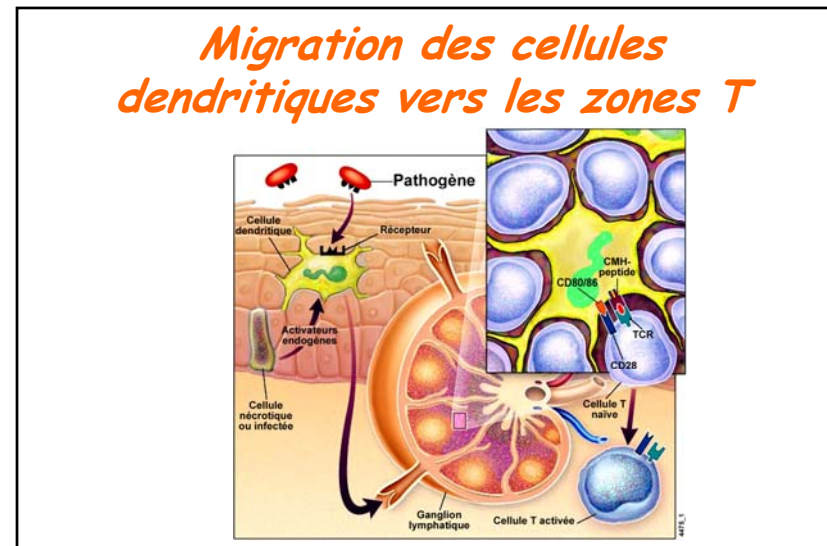
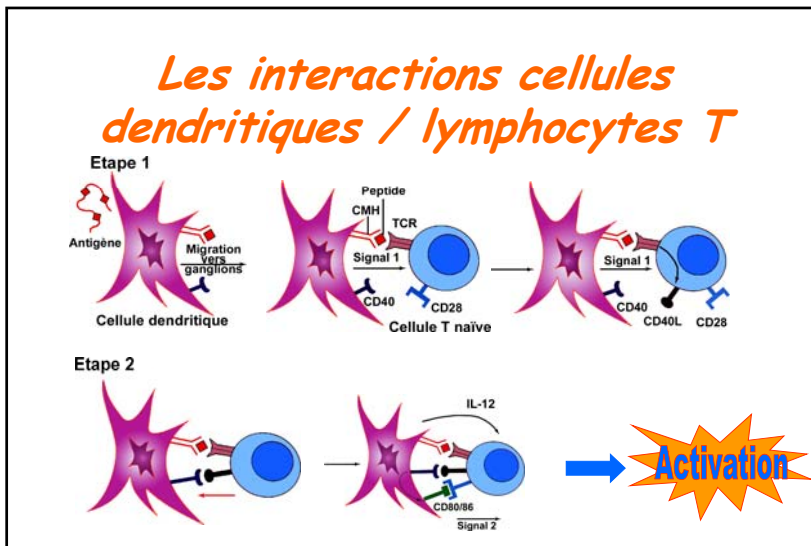
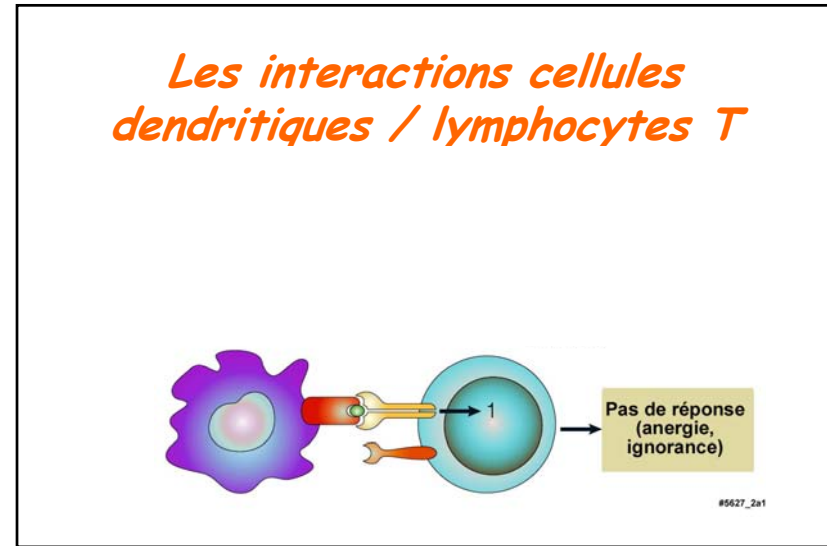
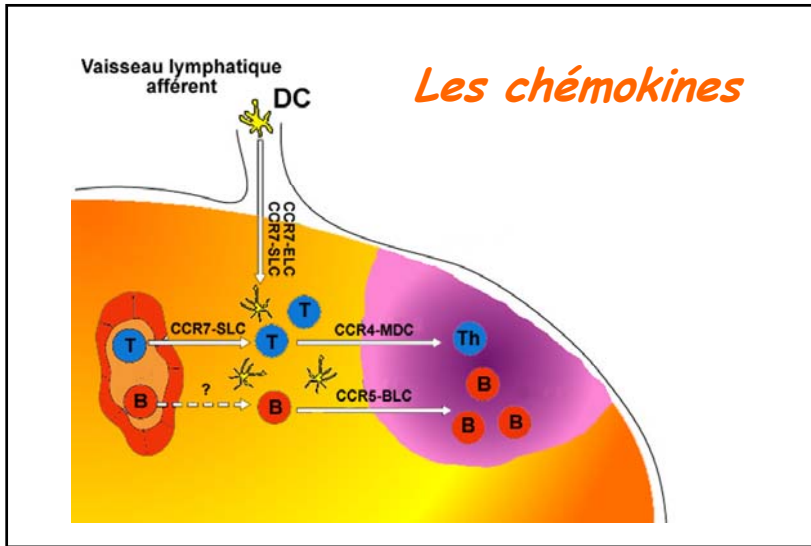


## Anatomie d'un ganglion

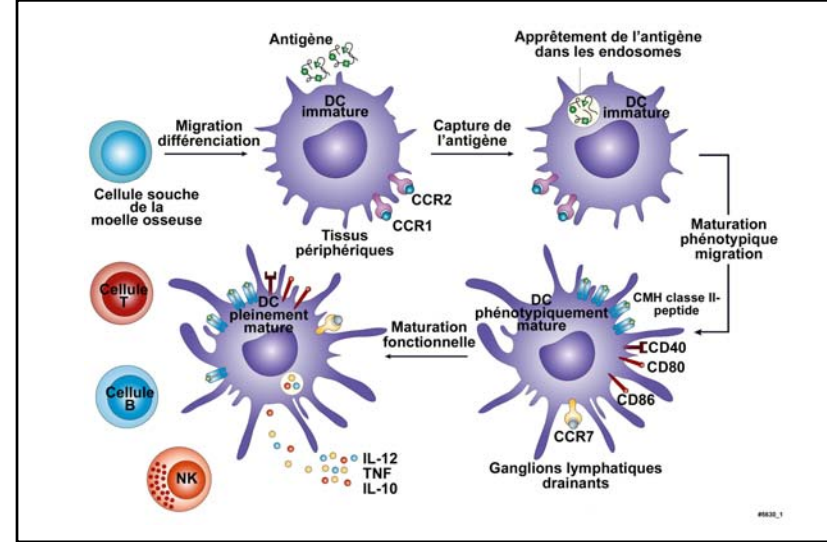
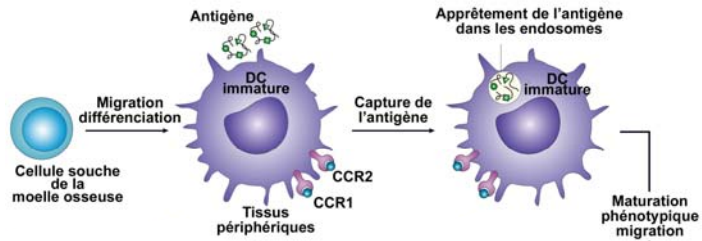


## La Zone T et le follicule

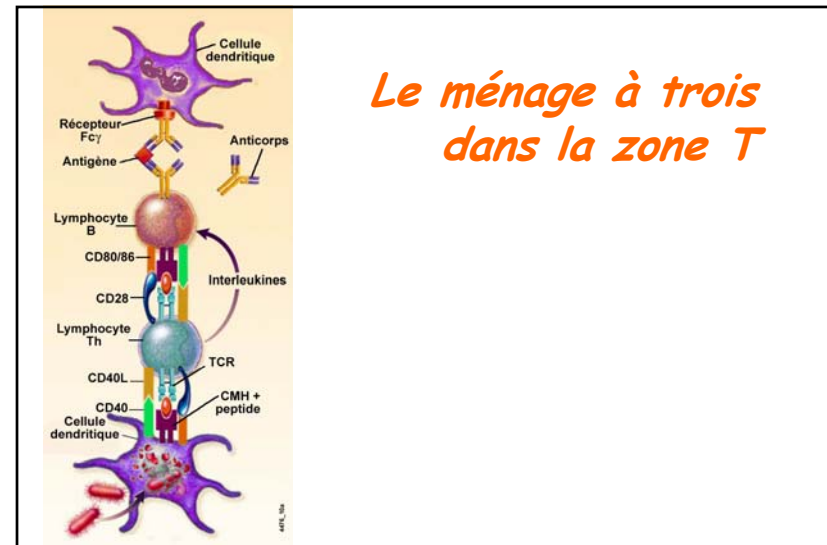
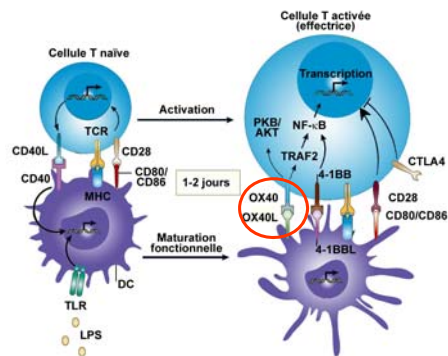




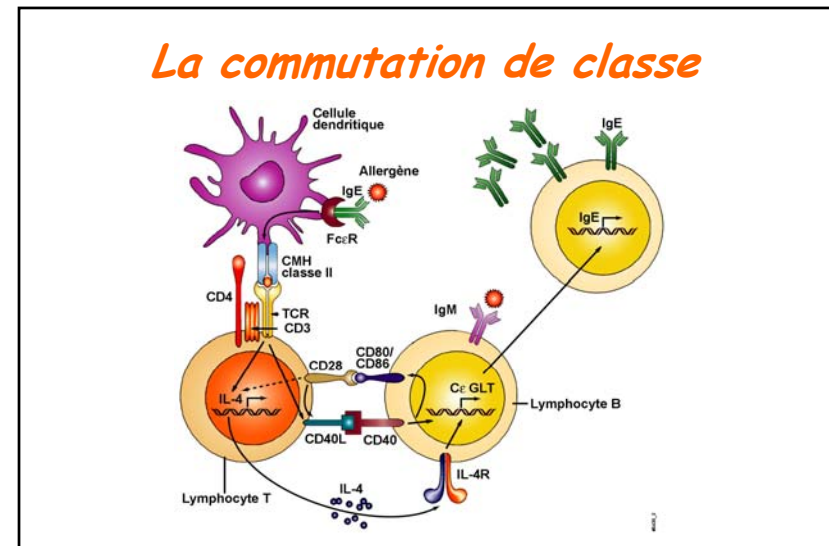
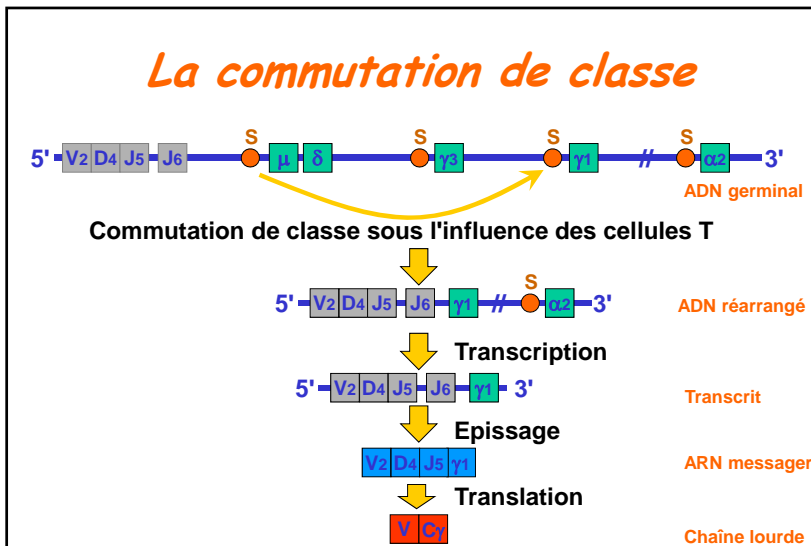
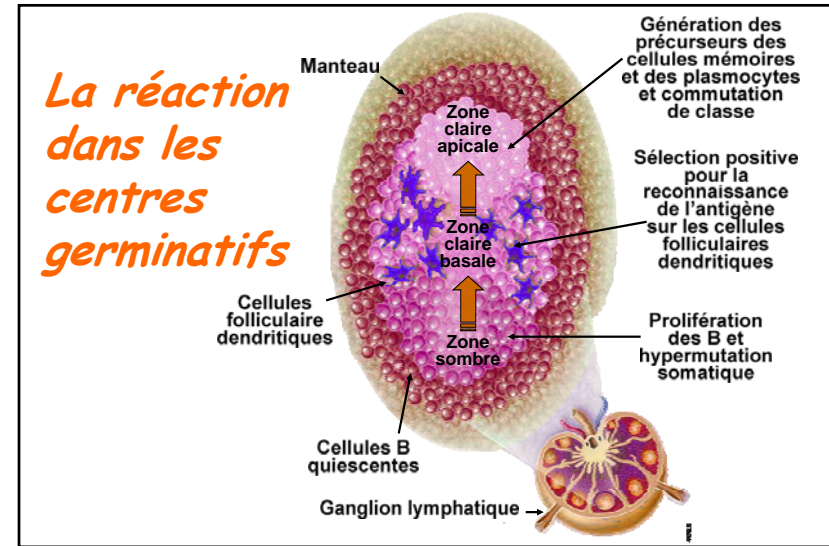
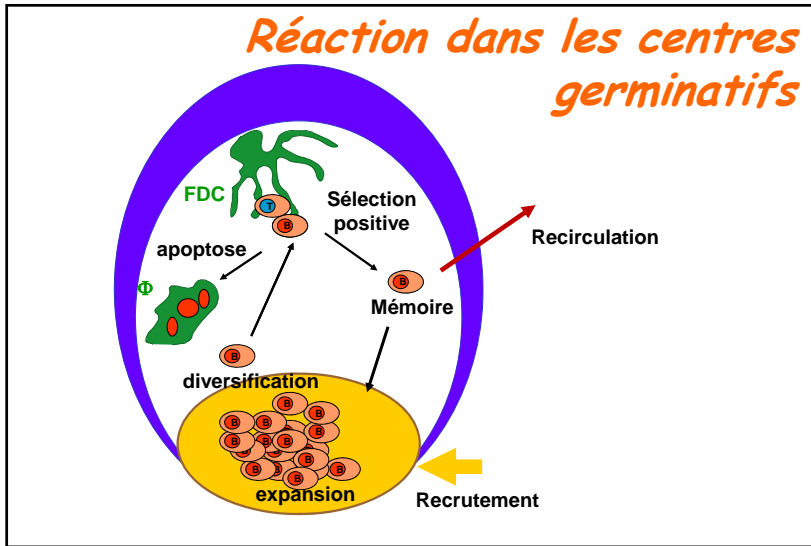
## Activation des cellules dendritiques

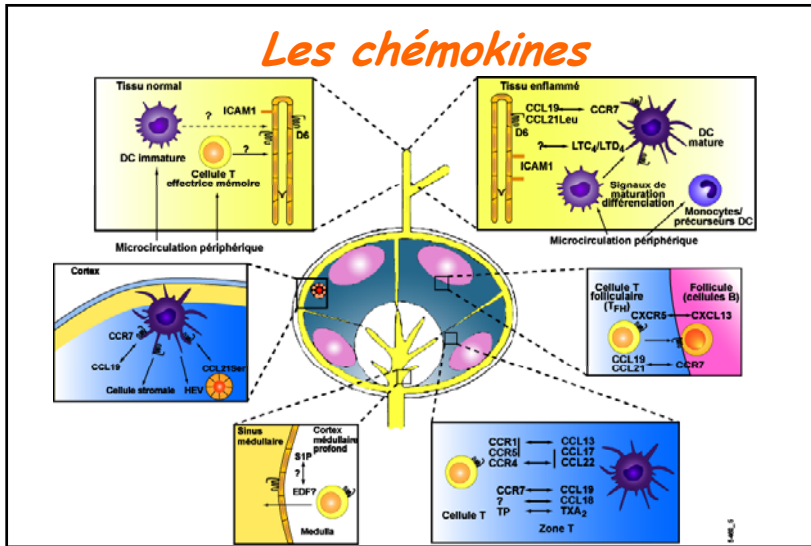


## Les interactions cellules dendritiques / lymphocytes T



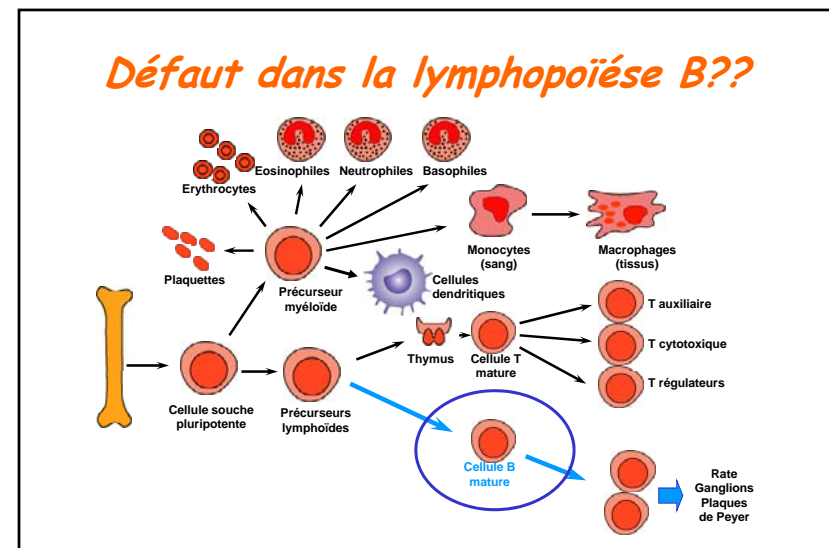
## Le ménage à trois dans la zone T





### L'immunosénescence (1)

Immunité innée peu affectée  
 Involution du thymus  
 Nombre de lymphocytes ↔  
**Mais** changement dans les populations  
 Inflammation ↑  
 Réponses antigène-spécifiques ↓  
 Autoimmunité ↑



## L'immunosénescence (2)

% lymphocytes B ↔

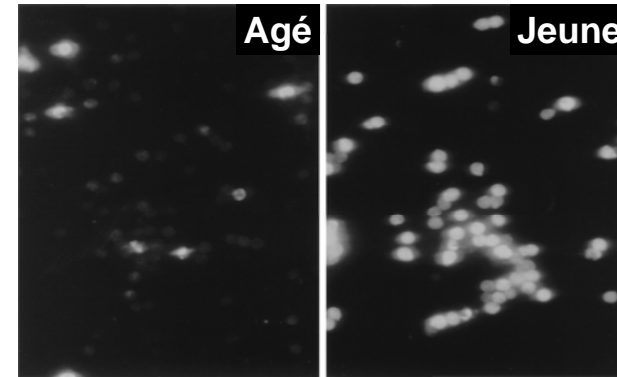
Cellules B

Modification du répertoire

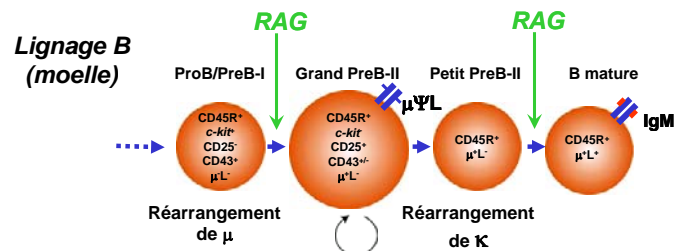
- Défaut de RAG et hélicase ku 70/80
- Défaut de mutations somatiques
- Défaut de commutation de classe
- Anticorps autoréactifs (sans pathologie)

Populations clonales

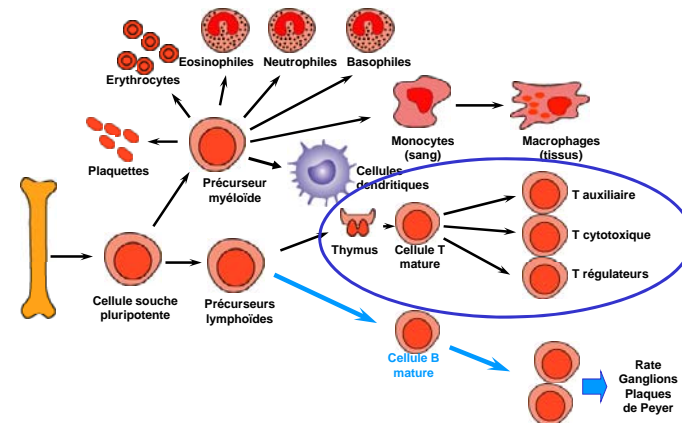
## Défaut dans l'expression de RAG-1 et 2



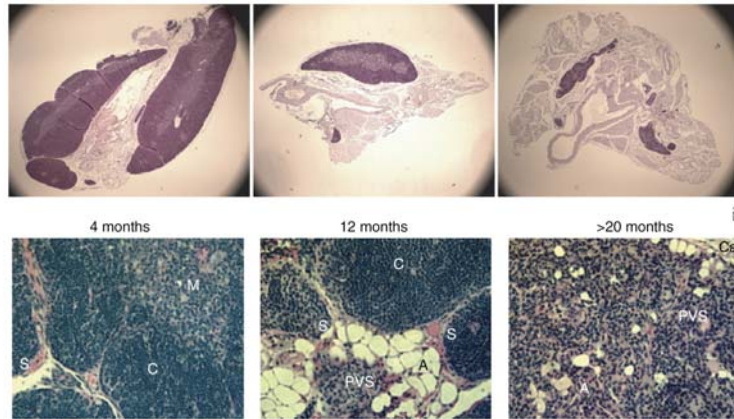
## Rôle des RAG



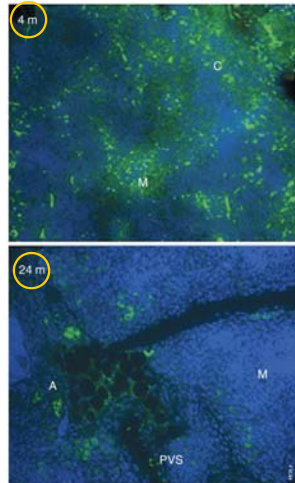
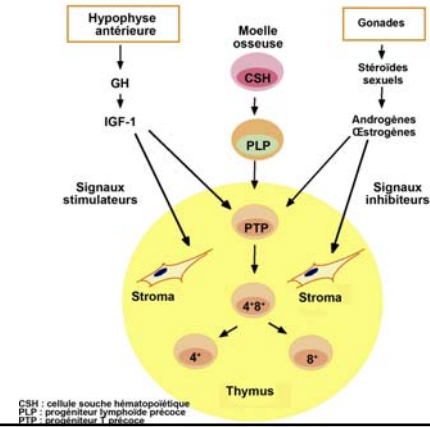
## Défaut dans l'a lymphopoïèse T??



## Involution du thymus chez la souris



## Signaux régulateurs du développement thymique



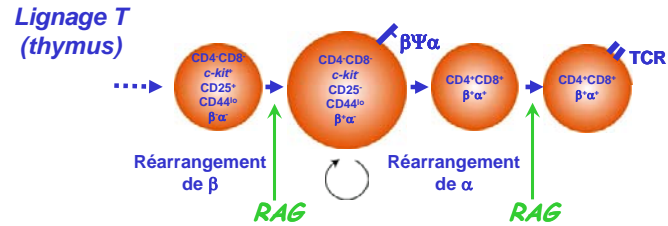
*Immunodétection de l'hormone de croissance dans le thymus de souris jeune et âgée*

## L'immunosénescence (3)

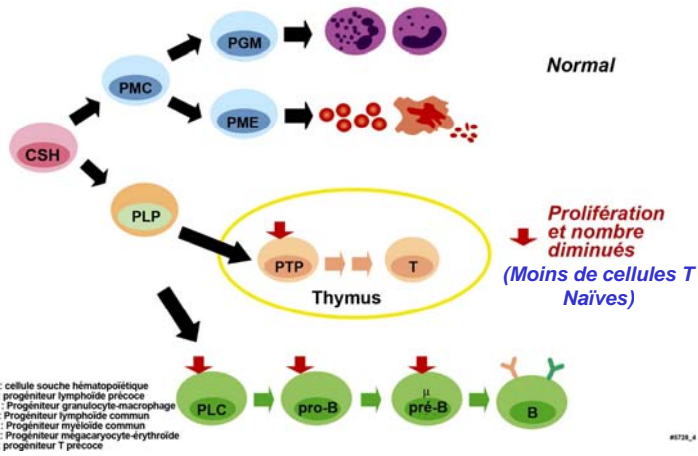
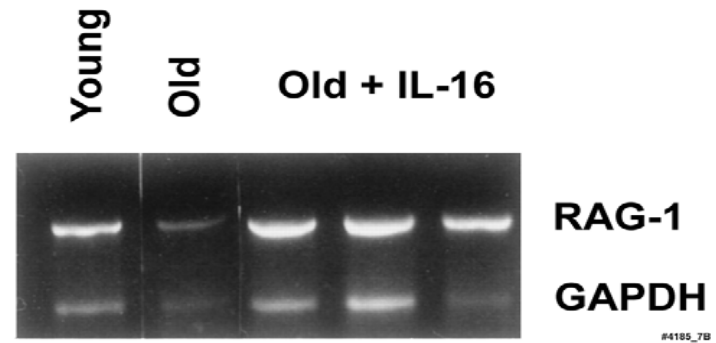
%T naïves ↓  
 %T mémoires ↑  
 CD3<sup>+</sup> CD28<sup>-</sup> ↑  
 Induction CD40L ↓  
 Apoptose (Fas, TNF- $\alpha$ ) ↓  
 Populations clonales

**Cellules T**

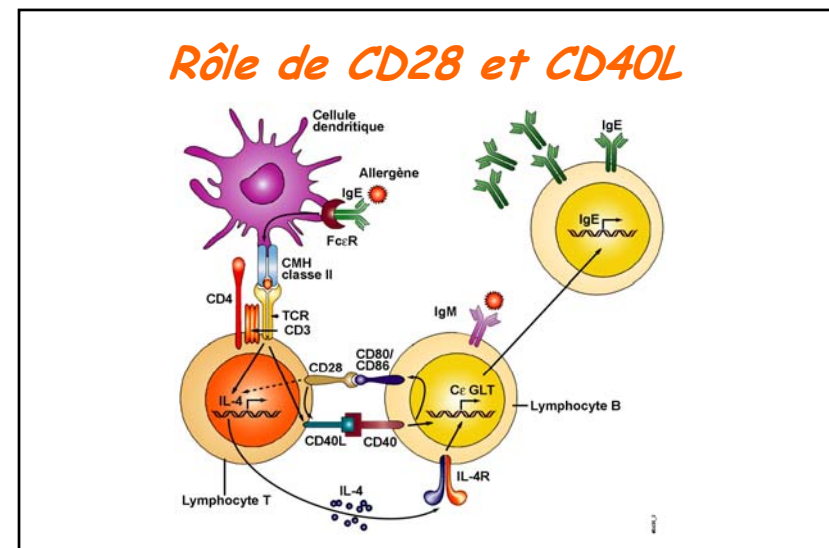
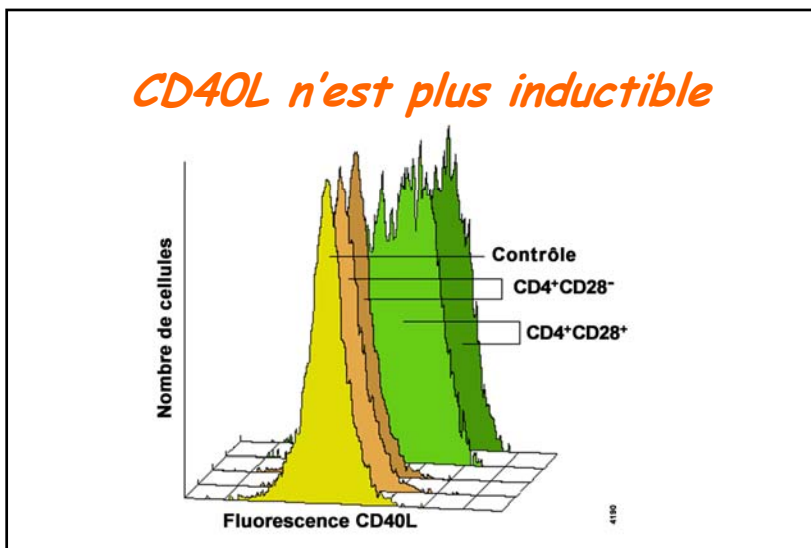
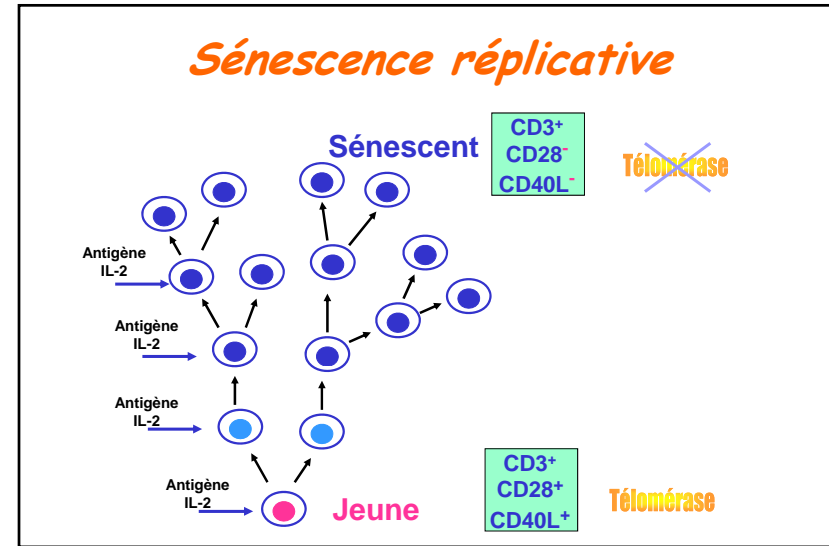
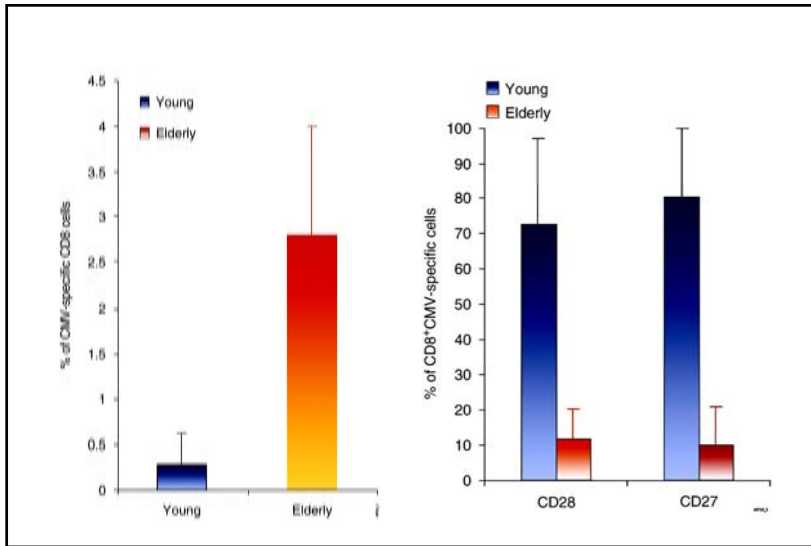
## Rôle des RAG

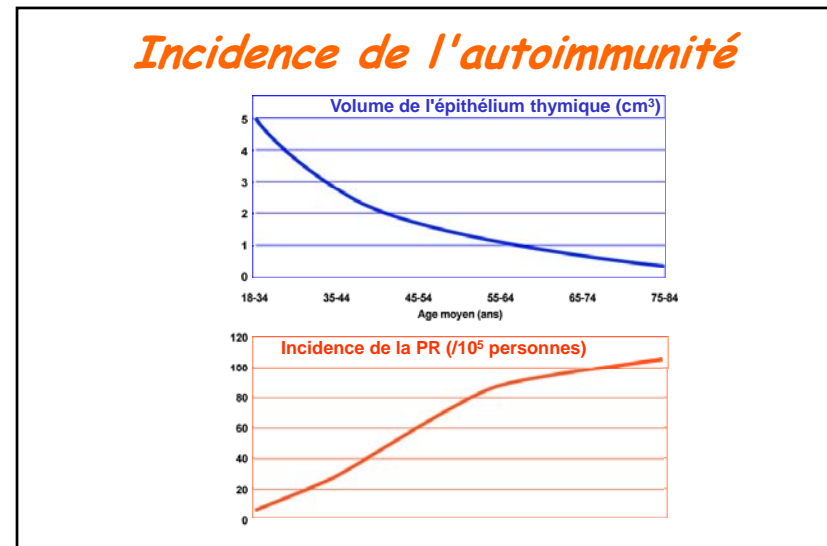
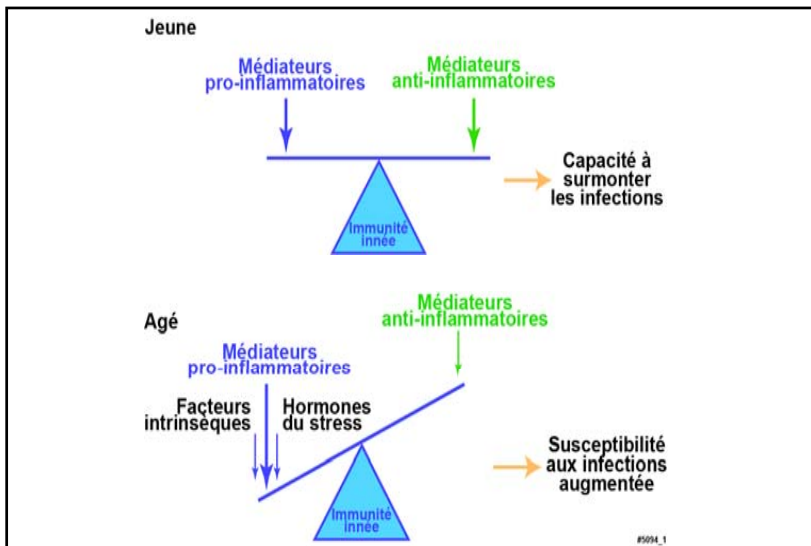
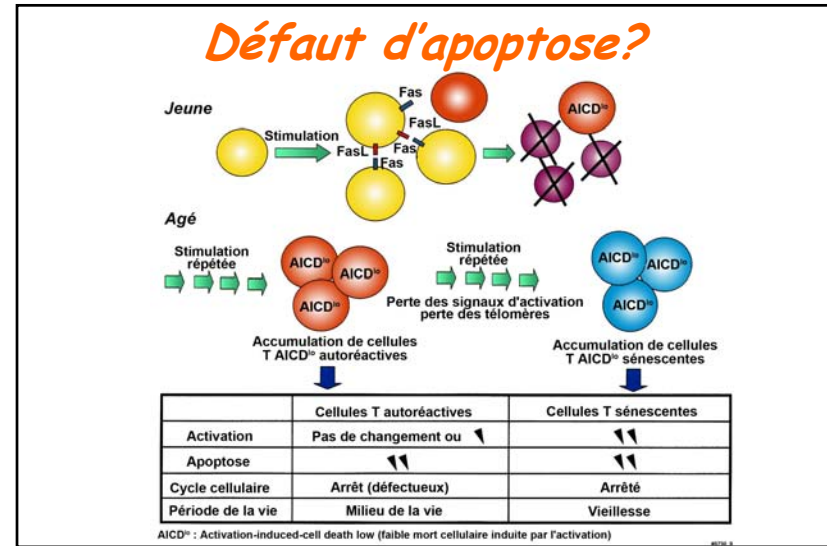
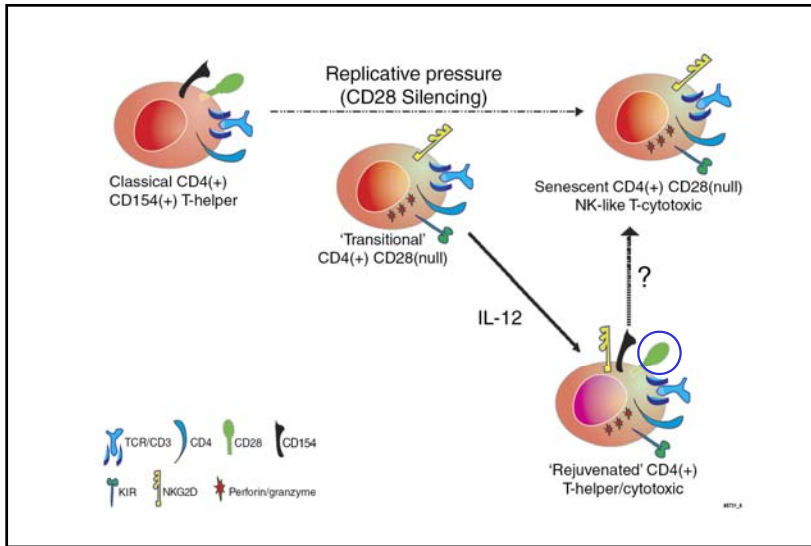


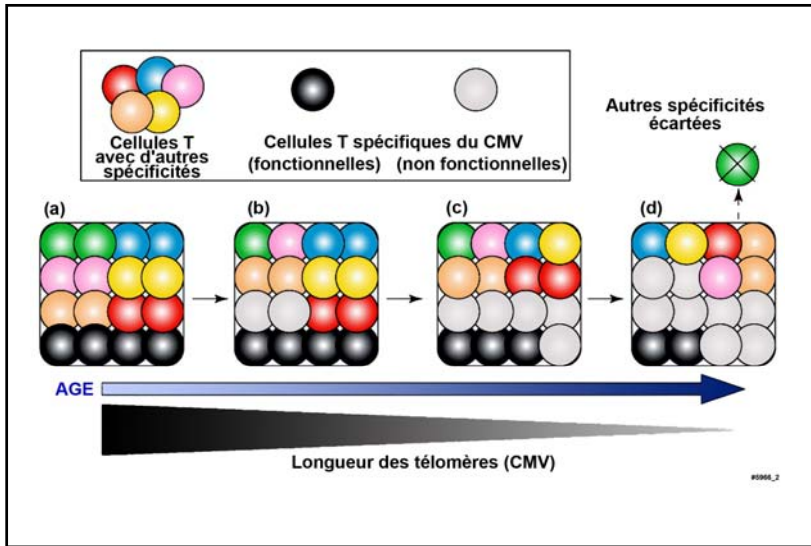
## L'IL-16 restaure l'expression de RAG-1 et 2



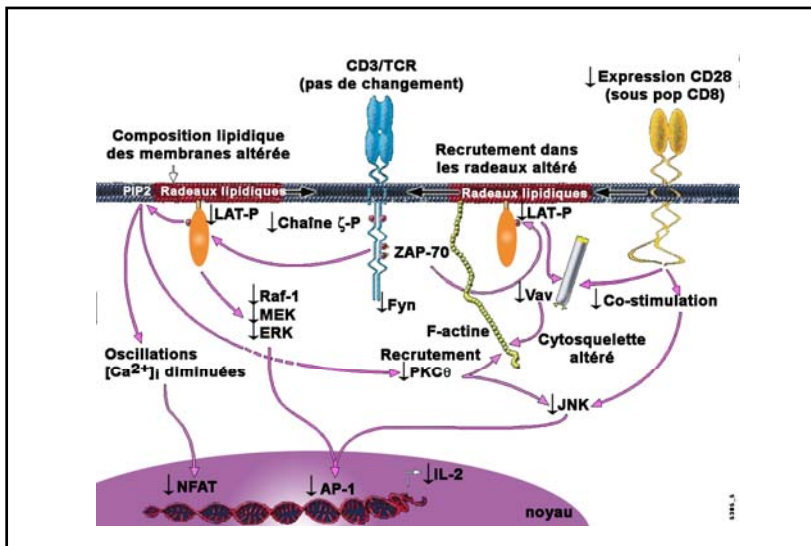
*L'immunosénescence est-elle le résultat d'infections chroniques?*



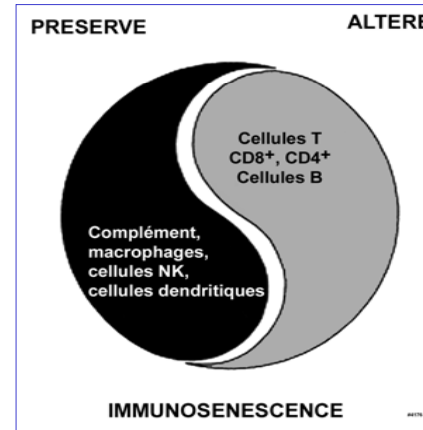




*Défaut dans la signalisation?*

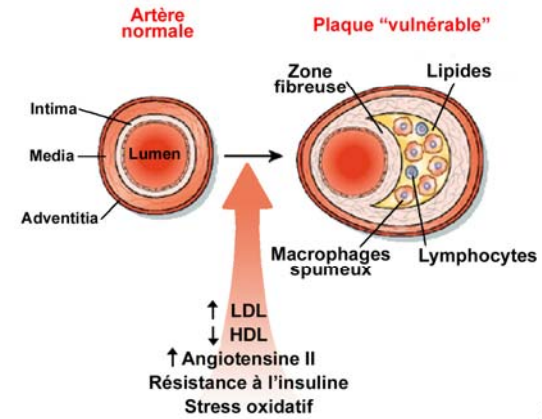


*Théorie du remodelage*

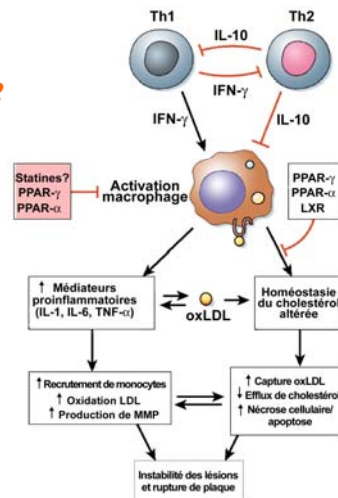


## Conséquences de l'inflammation chronique

## Athérosclérose



## Athérosclérose



*Nécessité de considérer le vieillissement de façon intégrée*