Regulation of adaptive immunity mechanisms

Imunology 8

What if it does not work

Self and not self

- autoimunity

Regulation

- hypersensitivity
- anergy

Imunity system

- **Protection** foreign structures (antigens)
  - infections,
- **Discrimination** and recognition of self and foreign structures, **tolerance**
  – tumor, autotimunity,
- **Regulation** (autoregulation)
  – anergiy, alergy, hypersensitivity

So if it does not work

Discrimination self and foreign

- Inborn immunity – nonspecific receptors- recognise foreign molecules of pathogens
- Adaptive immunity – specific receptors – randomly generated also against self molecules: **elimination of autoreacting cells**.

Escape from elimination (autoimunity)

- Molecules that were not present during the selection of receptors in thymus
- Those that arise later in the life – post adolescence
- Restriction in immunologically not reachable anatomical places

Autoreactive lymphocytes

Regulation – without regulation it does not work – tolerance

- Rejection of foreign molecules we are exposed generally (food, drinks, cosmetics, drugs....)
- Epitopes we are exposed rarely (interactions, in utero)

Tolerance

- Imuniy – system to eliminate external threats
- **Positive** (molecules MHC I and II) and **negative** (not against self)
- Thymocytes, that do not match the selection – apoptosis
- Some autoreactive T lymfocytes escape selection = > adaptive mechanisms how to escape autoreactivity
- **Tolerance** – **selective non responsevness** – after recognition of self, immunity starts non-destructive strategy

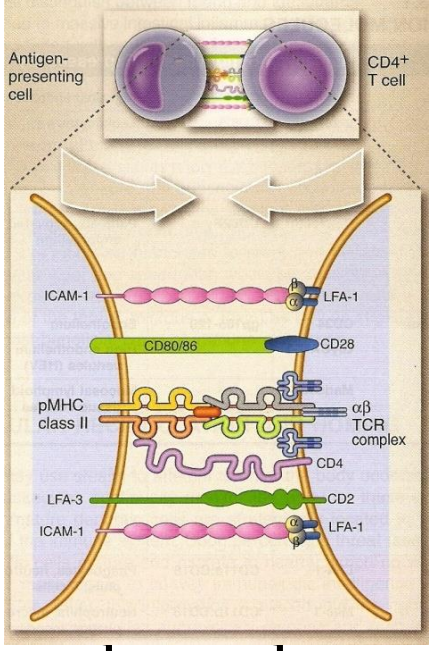
Mechanisms to minimise damages from autoreactive cells

- ANERGY
- CD152
- REGULATION T CELLS
  - CD4 Treg
  - CD8 Tsupresspr

Anergy

- Non responsevness of ly after exposition to
  - pMHC (T bb) or free antigen (B bb) = first signal
  - not existence of the second signal form APC resp. CD4
- Anergy is a form of regulation of activation of naive T and B cells.

What is the reason of T cell anergy



- All cells with the nucleus have MHC I and present self peptides
- Naive CD8 T cells specific for self antigens bound to pMHC I could be recognised and activated (1st signal) by the complex on any self cell and eliminate it
- The need of the 2nd signal from APC minimises the risk of selfactivation. (Example- activation of CD8 during viral infection cntr. Activation by self antigen)

CD152 role in anergy

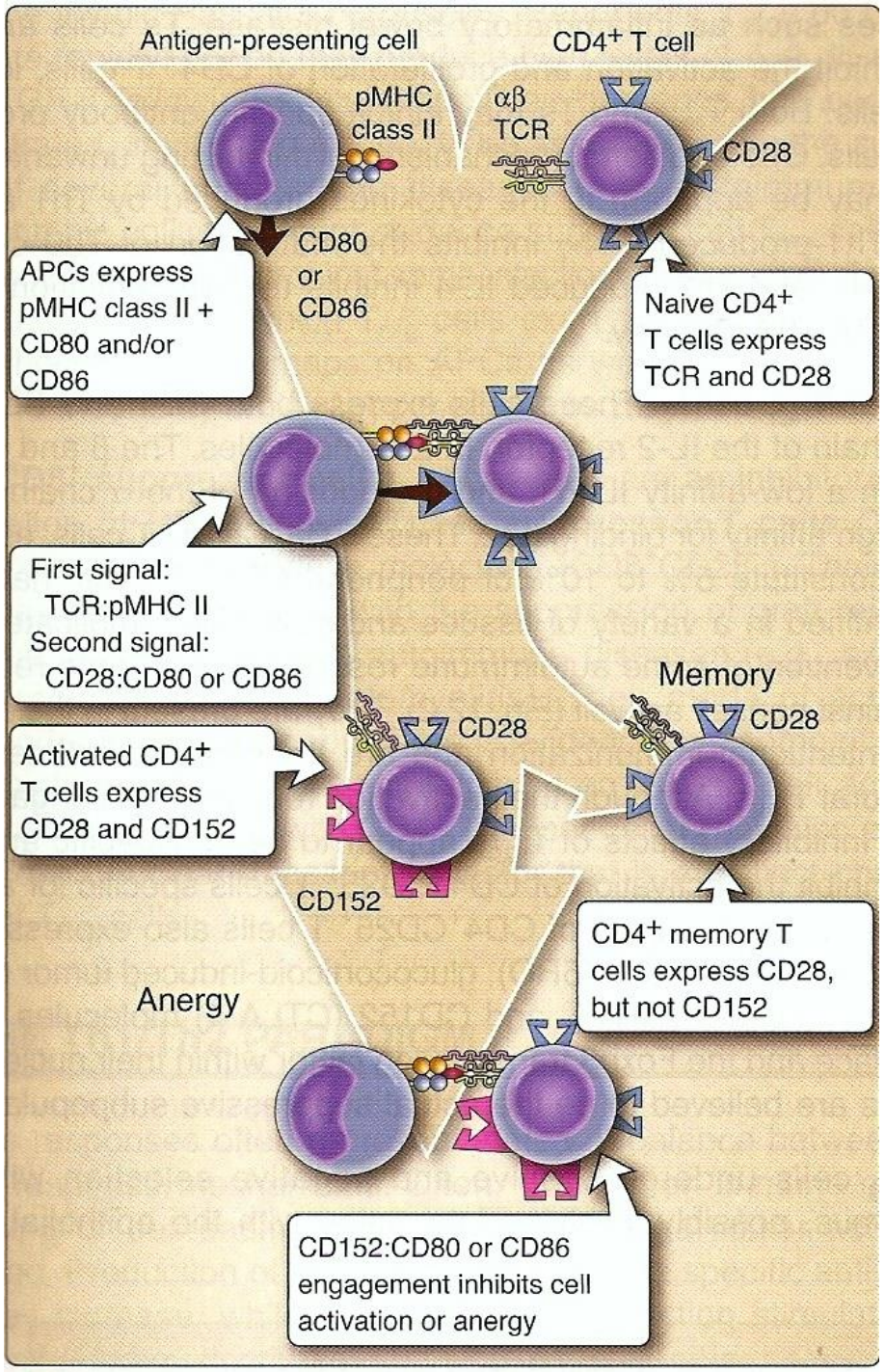
CD28 onT cell bind with CD80 or CD86, what are costimulating molecules on APC

- pMHC + **CD28+CD80/86** = IL2 + IL2receptor
- 1st signal + 2nd signal = activation:

CD152 in the Golgi app. migrates to the cell membrane, bind on **CD80/86** with 100 times stronger avidity => inhibtion of IL2 production, stop the cell life cycle

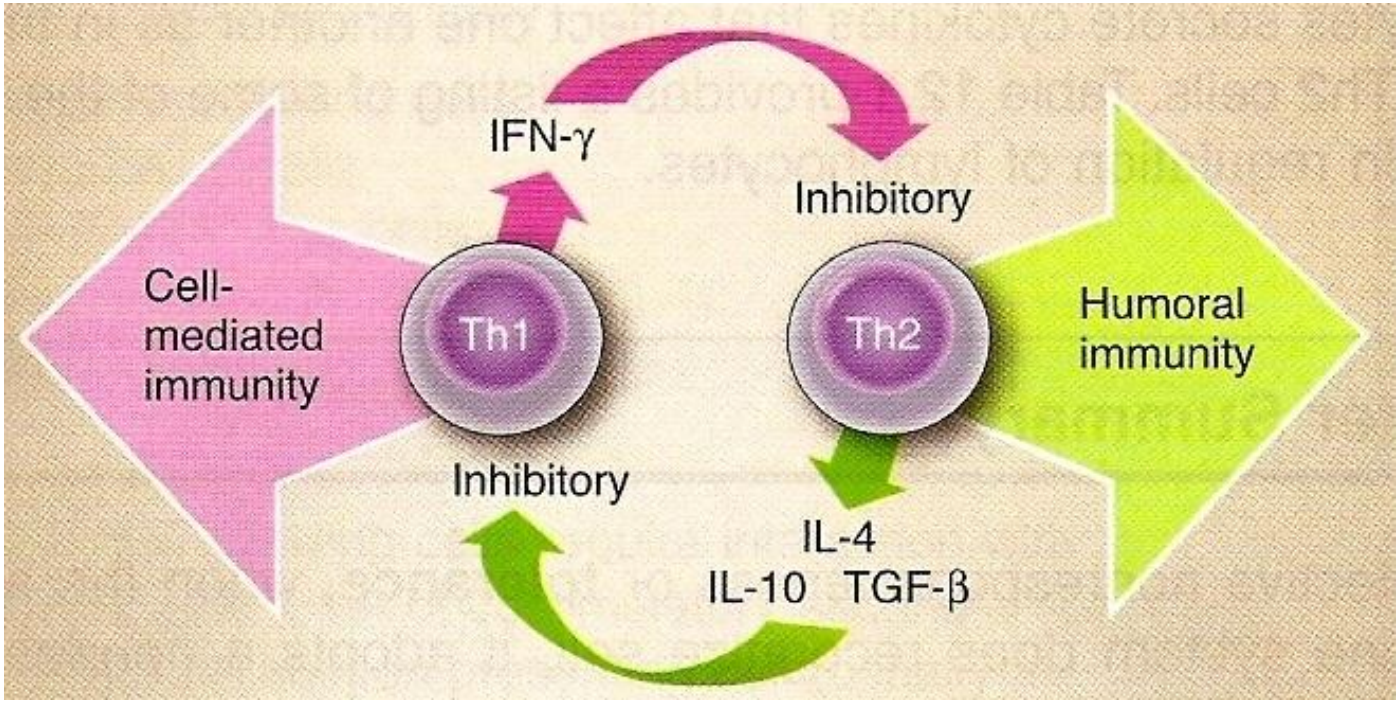
⇒activated T cells are inhibited if

⇒they are not needed



Th1/Th2

- Production of cytokíns minimalise unwanted reactions
- **Th1-** producese **IFγ** – inhibition of maturity of TH0 to TH2 **- CMI**
- **Th2** – produces **IL4** – inhibits maturation of TH0 na TH1- Humoral imunity


IFN-γ
Inhibitory
Cell-
mediated
immunity
Th1
Th2
Humoral
immunity
Inhibitory
IL-4
IL-10 TGF-β