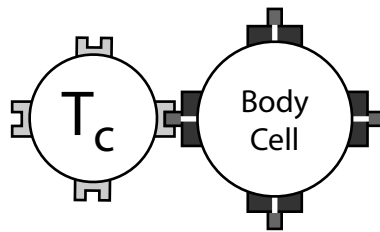


# Adaptive Immunity

A pictorial guide to  
*Humeral Immunity*  
and  
*Cellular Immunity*



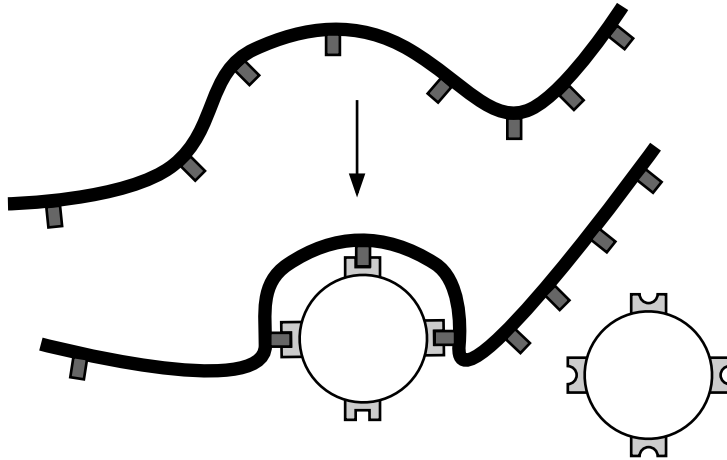
*By Noel Ways*

# Humeral Immunity

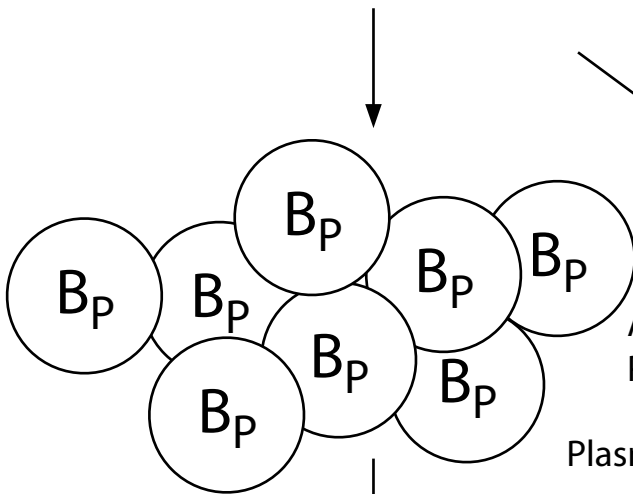
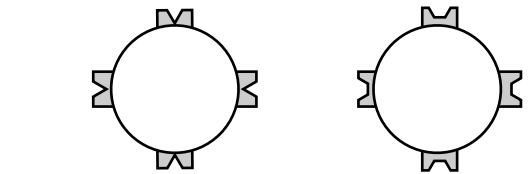
(T-independent antigens)

Pathogen with antigen present in body.  
Antigen is usually carbohydrate.

Immunocompetent B Cell binds multiple times with antigen.

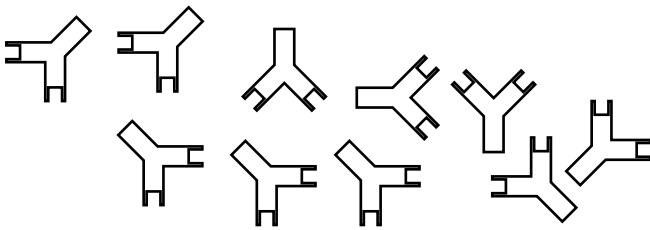


Immunocompetent B Cells

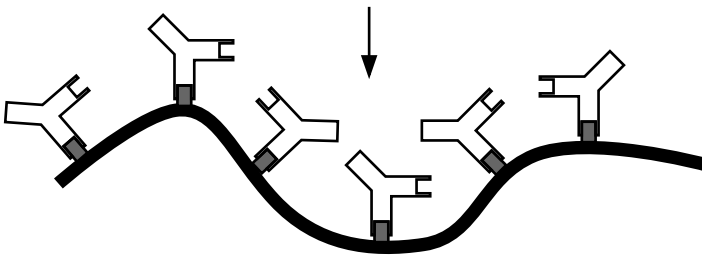


Activated B Cell divides and differentiates into Plasma B Cells (P<sub>B</sub>) and Memory B Cells (B<sub>M</sub>).

Plasma Cells clonally proliferate.

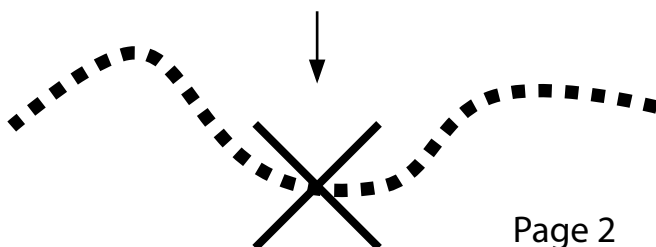


Plasma B cells mass produce antibodies.



Antibodies enter into circulation and bind to antigens on pathogen forming antibody-antigen complexes.

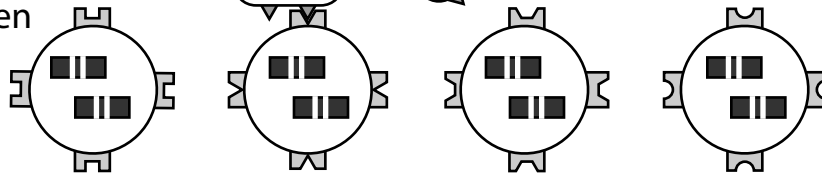
Antibody - antigen complexes "mark" pathogen for a vigorous attack.



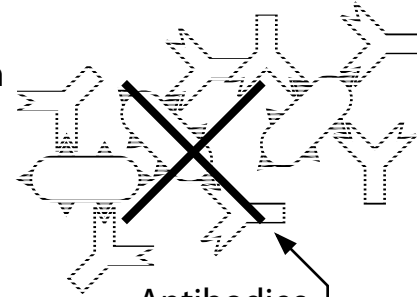
The pathogen is destroyed.

# Humeral Immunity (T-dependent antigens)

Immunocompetent B cell specific for antigen binds to antigen. Pathogen is then injected by receptor mediated endocytosis.

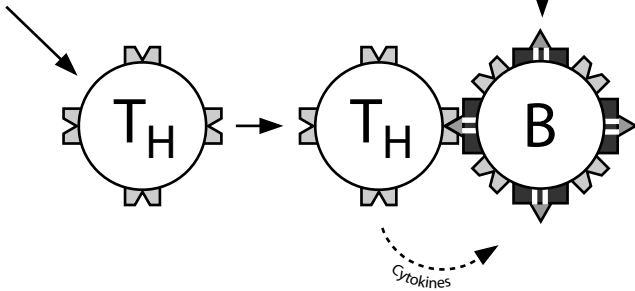


Pathogen with antigen present in body



Antibodies bind to antigen and "mark" the pathogen to be destroyed

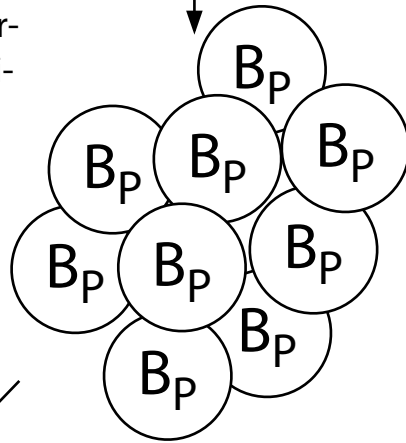
Cellular Immune response activates immunocompetent Helper T Cell ( $T_H$ ).



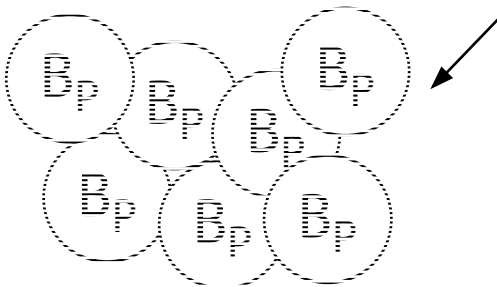
Antigen processing occurs and the antigen ( $\Delta$ ) is presented on cell surface in conjunction with MHC class II ( $\blacksquare\blacksquare$ ).

Activation proceeds with immunocompetent  $T_H$  recognition, binding, and secretion of Cytokines. B Cell divides and differentiates into Plasma B Cells and Memory B Cells.

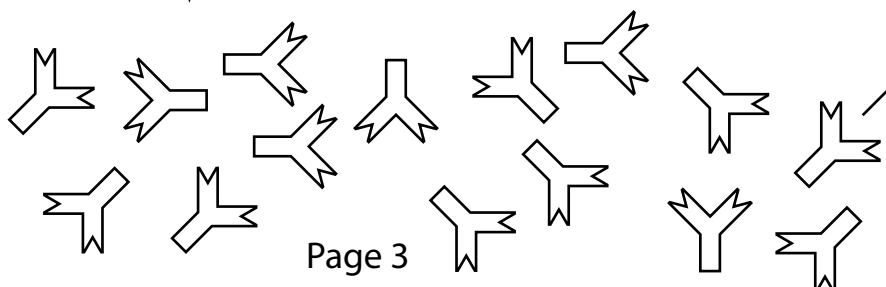
Plasma Cells clonally proliferated and mass-produce antibodies ( $\text{Y}$ ), which bind to antigen / MHC Class II Complex ( $\blacksquare\blacksquare$ ) marking pathogen destruction.



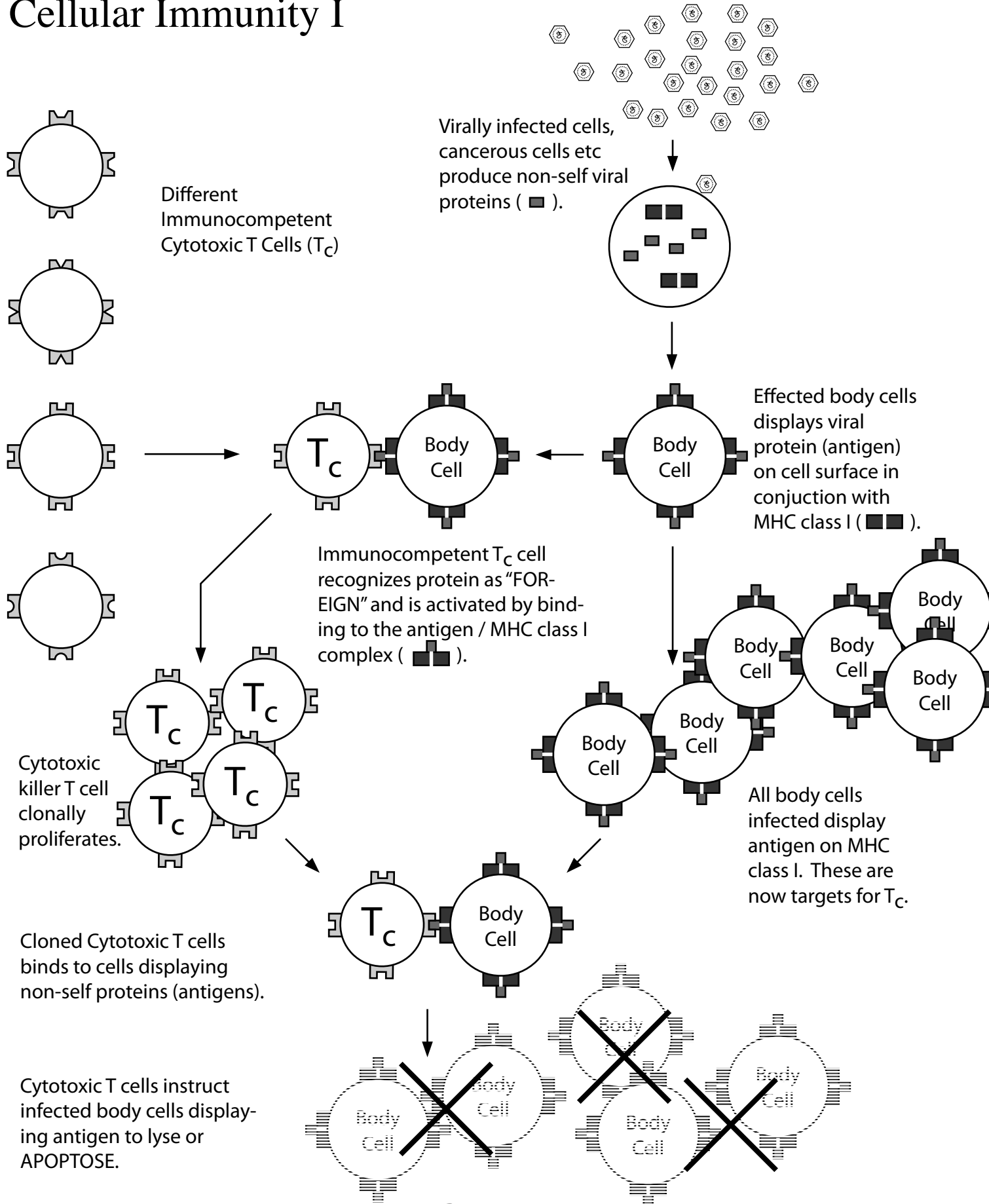
Long lived Memory B Cells can mount a quick response against subsequent infections by same antigenic pathogen.



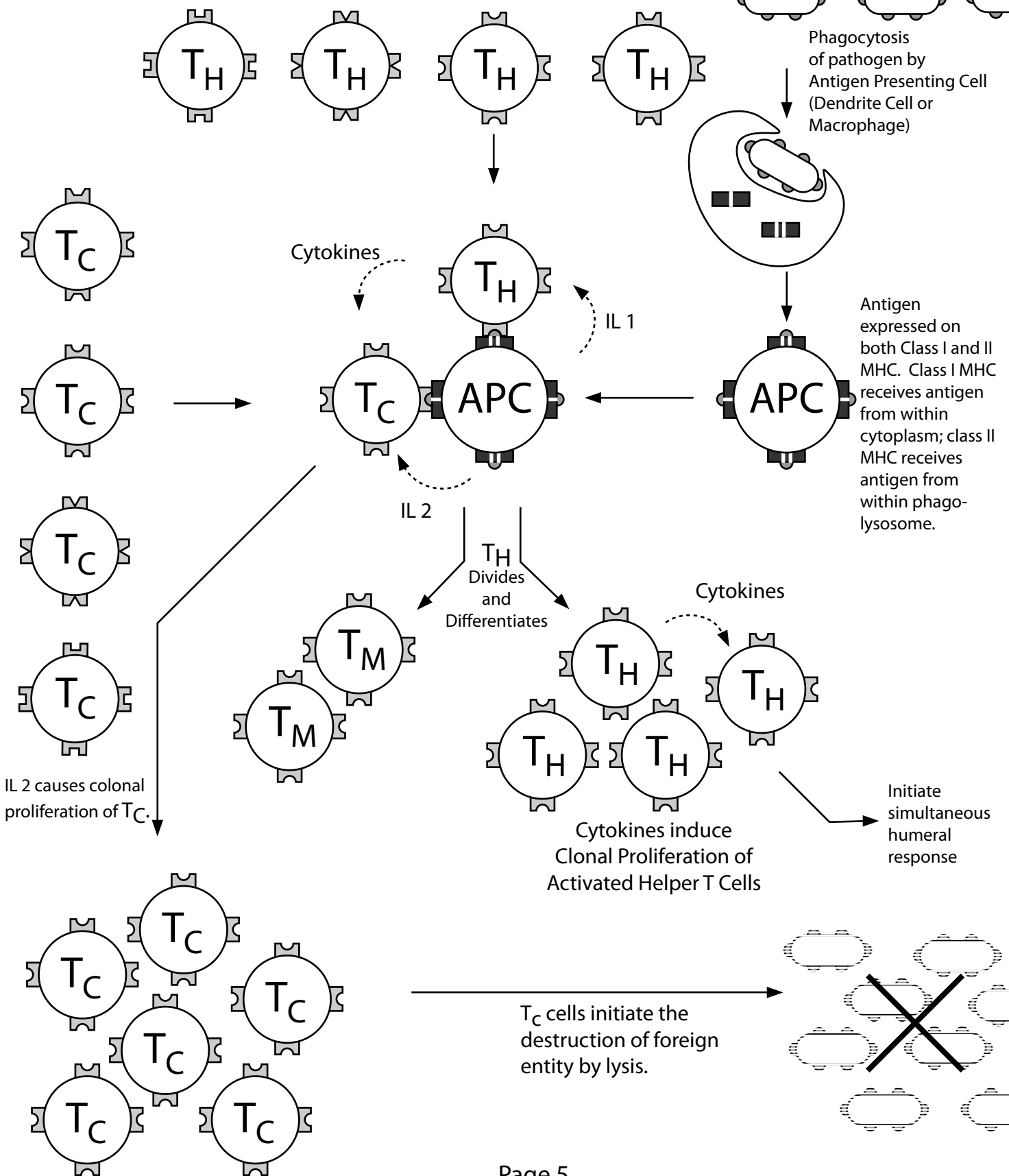
Plasma Cells are instructed to apoptose when their job is done.



# Cellular Immunity I



# Cellular Immunity II



# Interplay Between Cellular and Humeral Immune Responses

(Against a Bacterial Infection)

Cellular Immunity

Humeral Immunity

