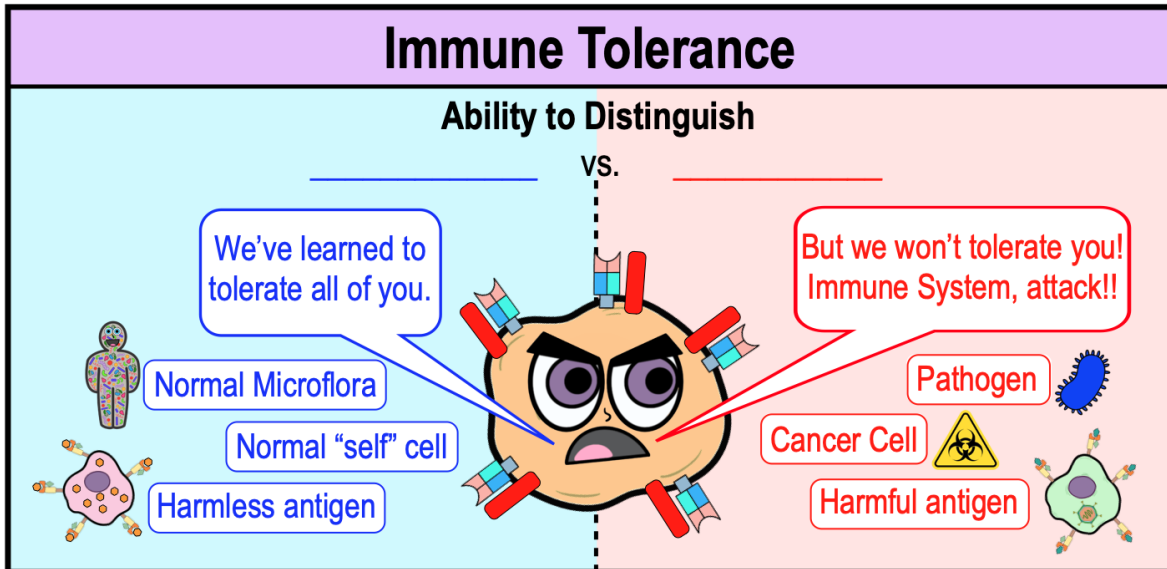


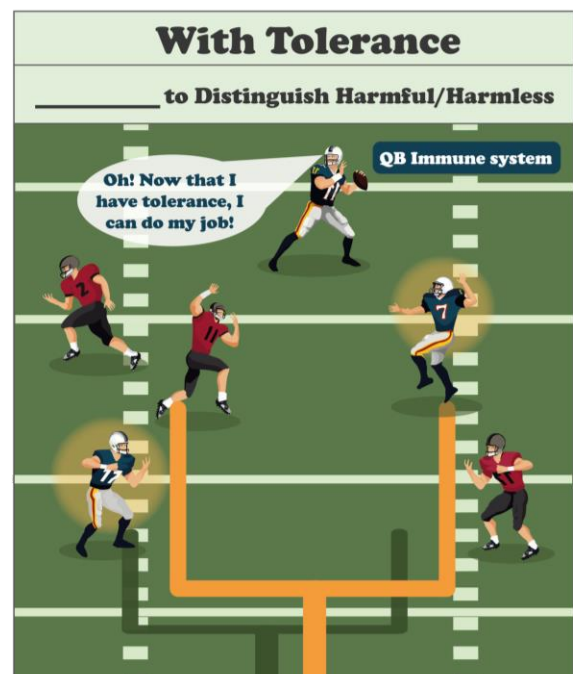
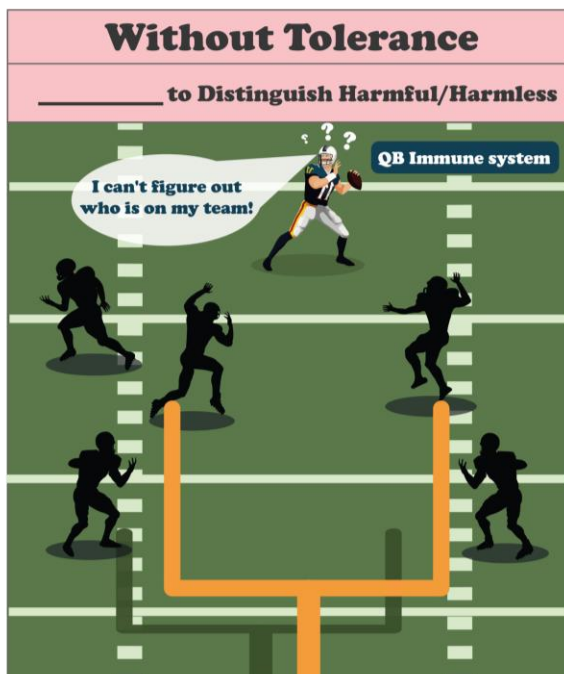
CONCEPT: IMMUNE TOLERANCE

- Our immune system must build *immune tolerance* to _____ an inappropriate response to *harmless* antigens.
 - **Immune Tolerance:** the ability of our immune system to ignore (or _____) any given molecule.
 - Goal: generate immune tolerance to ONLY _____ antigens.
 - Without immune tolerance, our immune system would attack our own cells, causing *autoimmune disease*.



Football Analogy for Immune Tolerance

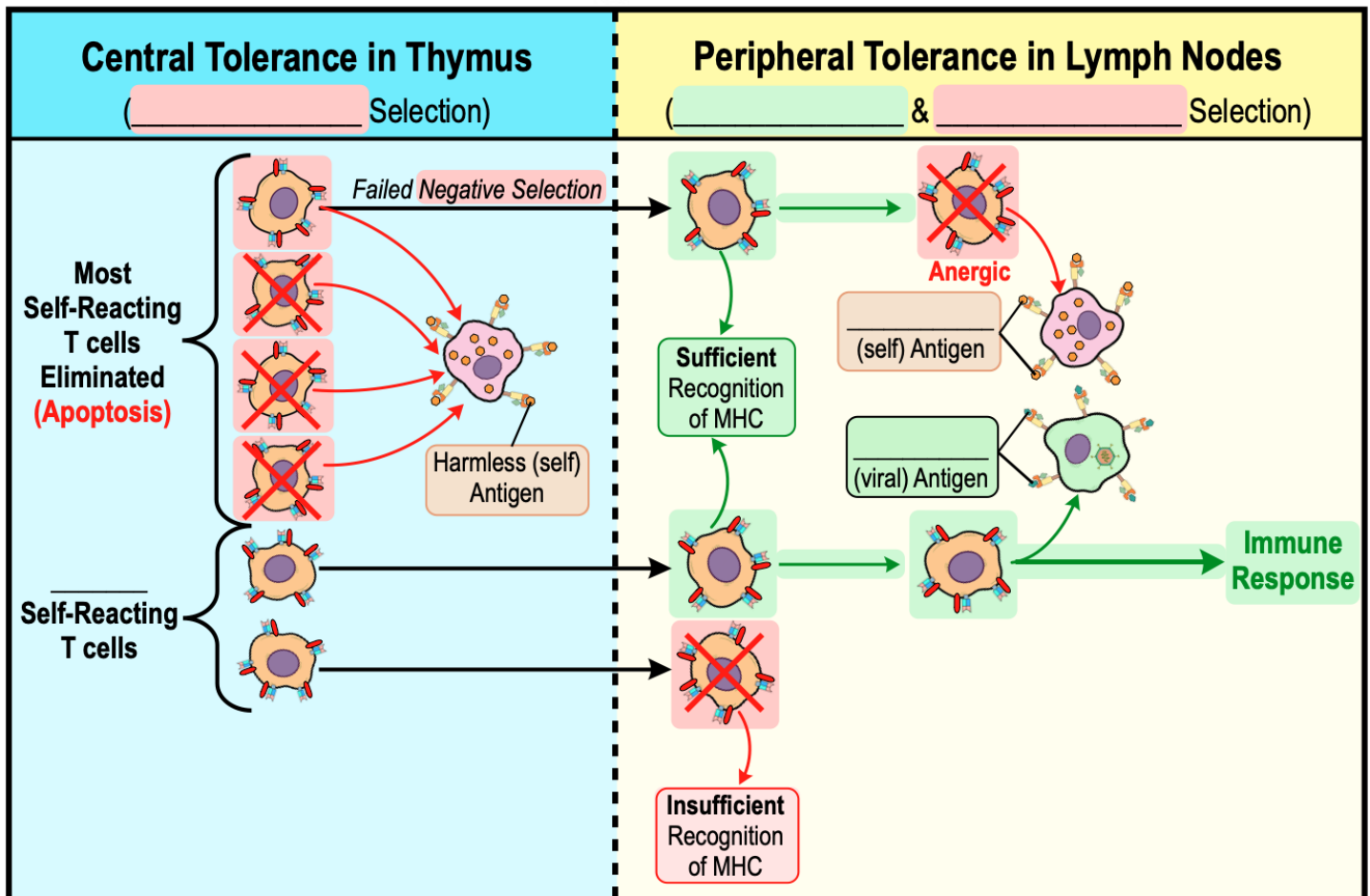
- **Immune tolerance:** ability for **immune system (QB)** to distinguish between harmful (opponent) & **harmless (teammates)**
 - **Without tolerance,** our immune system can _____ distinguish between harmful & harmless.
 - **_____ tolerance,** our immune system CAN distinguish between harmful & harmless & do its job properly.



CONCEPT: IMMUNE TOLERANCE

Central vs. Peripheral Tolerance

- Sometimes, our adaptive immune response mistakenly produces *self-reacting* T & B cells that harm our own cells.
 - To prevent this, our body builds-up a **tolerance** by strictly controlling T & B cell development.
- There are ____ types of tolerance mechanisms controlling T & B cell development:
 - 1) **Central Tolerance**: negative selection of mature T & B cells _____ leaving primary lymphoid organs.
 - Elimination/removal of _____-reacting T & B cells by *apoptosis*.
 - 2) **Peripheral Tolerance**: selection of mature T & B cells _____ leaving primary lymphoid organs.
 - Ex: Positively selects T cells that bind *any* MHC & negatively selects T cells that bind harmless antigens.
 - Self-reacting T & B cells become _____ (unresponsive) & eventually undergo apoptosis.
- Tolerance mechanisms are so strict that approximately 95% of T & B cells undergo apoptosis.



CONCEPT: IMMUNE TOLERANCE

PRACTICE: The most important function of peripheral tolerance is to:

- a) Eliminate mature B & T lymphocytes that bypassed central tolerance from reacting to self-cells.
- b) Eliminate inactive B & T lymphocytes from peripheral blood.
- c) Eliminate self-reacting B & T lymphocytes before they enter central tolerance.
- d) Eliminate mature B & T lymphocytes from the bone marrow.

PRACTICE: Where do T cells undergo central tolerance selection?

- a) Bone marrow.
- b) Pancreas.
- c) Thymus.
- d) Liver.
- e) Brain.

PRACTICE: What is immunological tolerance?

- a) The ability of the immune system to remove lymphocytes that recognize and attack foreign antigens.
- b) The ability of the immune system to differentiate between self and non-self antigens.
- c) The ability of the immune system to create antibodies that most effectively bind foreign antigens.
- d) The ability of the immune system to tolerate a certain amount of pathogens before triggering an immune response.

PRACTICE: Which of the following is NOT a consequence of the immune system lacking an immune tolerance?

- a) The immune system cells will only recognize and attack foreign antigens.
- b) The immune system cells will recognize and attack foreign and self-antigens.
- c) The immune system will attack self-cells causing autoimmune diseases.
- d) The immune system will not remove T and B lymphocytes that bind to self-antigens.