STRUCTURE OF MHC MOLECULES

(Major histocompatibility complex)

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Introduction

- MHC molecules are surface proteins that are present on the cell membrane of nucleated cells.
- Histo =Tissues
- Compatibility = Living together harmoniously.
- These molecules play an important role in recognizing self or non-self antigens.
- In the immune system, two types of MHC molecules work – MHC II, which is Present on T helper cells
- MHC I, which is present on T cytotoxic cells.

DEFINITION –

MHC molecules are membrane-attached proteins that work on the recognition of antigens between self and non-self.

The MHC molecule of the mouse is called the H-2 molecule.
MHC-forming genes are present on chromosome no. 6.

HISTORY –

Peter Gorer in 1930 found four groups of MHC molecules.

Georg, Jean Dausset, and Bariy received the Nobel Prize in 1980 for their contribution to the discovery of MHC molecules.

Classification of MHC Molecules

MHC molecules are classified into four classes –

Class I MHC molecule
Class II MHC molecule
Class III MHC molecule
Class IV MHC molecule

Above them, class I and class II MHC molecules play an important role in antigen recognition.

Class I MHC Molecule
It is a glycoprotein
molecular weight -45kDa
This MHC molecule is present in all nucleated cells except nervous tissues and platelets.
It presents an antigen to a Tc cell.

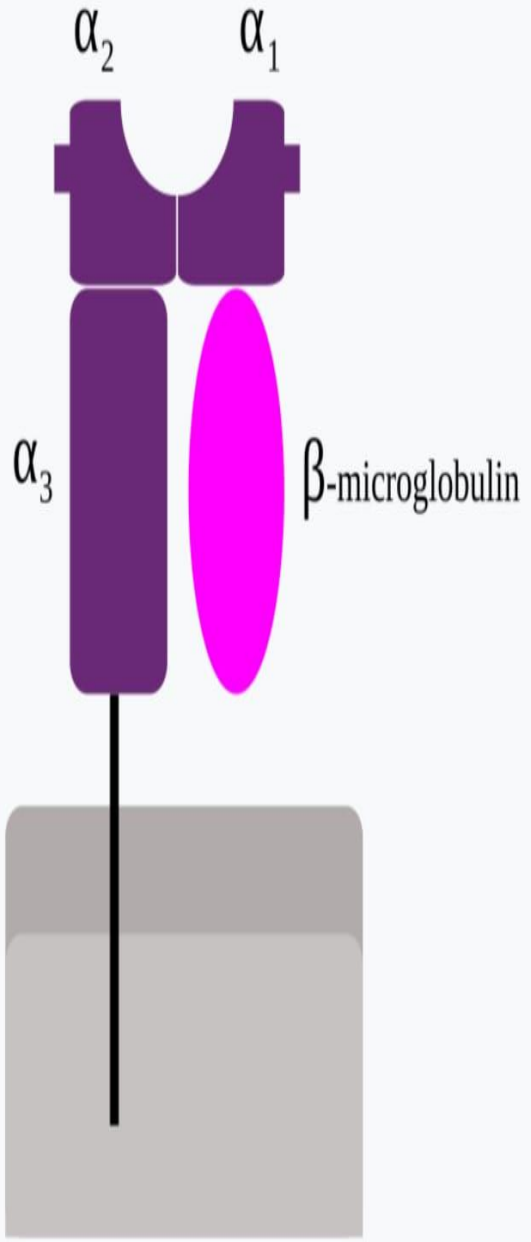
- **Structure of Class I MHC Molecules**

It is made up of two polypeptide chains –the alpha chain and the beta chain.

The alpha chain is attached to the beta chain non-covalently and contains a transmembrane protein.

The alpha chain has three domains – alpha -1,2, and 3. Each domain contains a 90 amino acid sequence.

Beta microglobulin does not contain a transmembrane protein.



Schematic representation of MHC class I

Class II MHC Molecules

Class II MHC molecules are present on the surface of antigen-presenting cells and Th cells.

It binds with exogenous antigens.

It binds with the CD4 adhesion molecule of Th cells.

Structure of class II MHC Molecule

It is made up of two polypeptide chains-alpha(33kDa) and beta (28kDa)chains.

Both chains are attached non covalently.

The alpha chain contains two subunits –alpha 1 and alpha 2.

The beta chain also contains two subunits- beta 1 and beta 2.

alpha 2 and beta 2are transmembrane domains anchoring the MHC to the plasma membrane.

The alpha 1 and beta 1 domains jointly bear a peptide-binding groove.