**Final -Term Exam (spring-2020)**

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**Q1. Define the following terms with examples.**

1. Auto graft
2. Syngeneic graft
3. Xenograft
4. Allograph

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| **Auto graft** | **Syngeneic graft** | **Xenograft** | **Allograph** |
| Autograph is as tissue from one point to other of the same individual body.  Higher normal stability rate and low graph.  Low cost  No risk of immune system.  **Example:** -monkey heart transport to human | It is a soft tissue between two individuals who are generally same.  The tissue or organ transported from a one membrane species like kidney transfer from one identical twin to other.  They dose not provoke the immune response  The rejection by an animal of syngeneic graft tumor graph prove that the tumor cell carries their own specific cell.  **Example**: -graph virus host disease | A tissue or organ that are transplant from a donor from a different species from the recipient.  Also known as hetrograph.  Transportation across the species barrier  The prefix xeno means forigan it come from great words meaning stanger or host.  **Example** transportation of heart of babben to human**.** | the tissue takes from other body and donated to other person  **Example**: -the tissue takes from one brother and donated to their own brother |

**Q2. What is MHC Complex and HLA, also write down its classes?**

**Deification**

Major histocompatibility complex is a member attached protein which work on recognition of antigen between self and non-self-body and antigen presentation.

**MAJOR HISTOCOMPATIBILITY COMPLEX**

The success of tissues and organ transplant depend on the donor and recipient human leukocytes antigen (HLA) encoded by HLA Gene

These proteins are alloantigen 'i.e. they differ among member of same species

If the HLA protein on the donor cell differ from those on the recipient cell, an in immune response occur in the recipient

**HLA Human leukocytes antigen. HLA is the human leukocytes antigen**

HLA is the MHC molecules present in the human beings

HLA is a set of surface protein present on the surface of all nucleated cell they are responsible for graft rejections, adoptive immunity and defense against infection

Some time it is expressed on cancer cell destruction.

MHC is the general term referring to the cell surface antigen of vertebrates

The genes of HLA protein are clustered in the major historicity complex located on their short arm of the chromosome 6

Three of the genes HLA-A, HLA-B, HLA-C) code for the class one MHC protein.

Several HLA-D loci determine the class 2 MHC protein i.e. DP, DQ and last one is DR.

**MHC PROTEIN**

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| **Class 1 MHC proteins** | **Class 2 MHC protein** | **Class III MHC molecule** | **Class four MHC Protein** |
| These are glycoproteins found on the surface of virtually all nucleated cell  The complete class 1 Protein is composed of a 45000 molecules weight heavy chain noncovalent bound to beta macroglobulin.  The heavy chain is highly polymorphic and is similar to an immunoglobulin molecule, it has hypervariable regions in its N terminals region  The polymorphisms of these molecules is important in the recognition of self and non self  The heavy chain also has a constant region where the CD8 Protein of the cytotoxic T cell bind | MHC are glycoprotein occur in the surface of specific cell including b cell, spleen and the skin.MHC protein are highly polymorphic glycoprotein composed of two poly peptide they are nonconvently bond. Like class one protein they have hypervariable regions that provide much of the polymorphism. Unlike class 1 protein which have only one chain encoded by the MHC locus the both chain of the class two protein is encoded by the MHC locus. The two peptide also have a specific region where the CD4 Protein of the T-cell bind Like class 1 Protein, have hypervariable regions that provide much of the polymorphism. Unlike class 1 Protein which have only one chain encoded by MHC locus beta 2 macroglobulin is encoded on chromosome 15 both chain of the class 11 Protein is encoded by MHC locus. The two peptide also have a constant region where the CD4 protein of helper T cell bind | These molecules include complement like C2 and C4 of factor B | These class molecule is present on the T cell of leukocyte as well as on immune thymocite. |

**Q3. Describe Coombs Classification of Hypersensitivity?**

**Hypersensitivity**

Undesirable or harmful reaction of the immune system.

Exaggerated response of immune system.

Also known as intolerance or allergy

**Classification**

**Coombs and Gel classification**

**1**-Type I - immediate

2-Type II - antibody-dependent

3-Type III - immune complex

4-Type IV - cell-mediated or delayed

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| **Type I - immediate** | **Type II antibody dependent** | **Type III - immune complex** | **Type IV - cell-mediated or delayed** |
| Type I hypersensitivity is an allergic reaction provoked by re-exposure to a specific antigen. Exposure may be by [ingestion](http://en.wikipedia.org/wiki/Ingestion), [inhalation](http://en.wikipedia.org/wiki/Inhalation), [injection](http://en.wikipedia.org/wiki/Injection_%28medicine%29), or direct contact. The reaction is mediated by [IgE](http://en.wikipedia.org/wiki/IgE) [antibodies](http://en.wikipedia.org/wiki/Antibodies) and produced by the immediate release of [histamine](http://en.wikipedia.org/wiki/Histamine), [tryptic](http://en.wikipedia.org/wiki/Tryptase), [arachidonate](http://en.wikipedia.org/wiki/Arachidonate) and derivatives by [basophils](http://en.wikipedia.org/wiki/Basophil) and cells. This causes an [inflammatory](http://en.wikipedia.org/wiki/Inflammation) response leading to an immediate (within seconds to minutes) reaction. The reaction may be either local or systemic. Symptoms vary from mild irritation to sudden death from shock. Treatment usually involves [epinephrine](http://en.wikipedia.org/wiki/Epinephrine), [antihistamines](http://en.wikipedia.org/wiki/Antihistamines), and [corticosteroids](http://en.wikipedia.org/wiki/Corticosteroid)  **Examples:**  Allergic [asthma](http://en.wikipedia.org/wiki/Asthma) | In type II hypersensitivity, the antibodies produced by the immune response bind to antigens on the patient's own cell surfaces. [IgG](http://en.wikipedia.org/wiki/IgG) and [IgM](http://en.wikipedia.org/wiki/IgM) antibodies bind to these antigens to form complexes that activate the [complement](http://en.wikipedia.org/wiki/Complement_system) activation for eliminating cells presenting foreign antigens .  As a result mediators of acute inflammation are generated at the site and [membrane attack complexes](http://en.wikipedia.org/wiki/Membrane_attack_complex) cause cell lysis and death. The reaction takes hours to a day.  **Example**  Autoimmune hemolytic [anemia](http://en.wikipedia.org/wiki/Anaemia). | In type III hypersensitivity:  soluble immune complexes (aggregations of antigens and IgG and IgM antibodies) form in the [blood](http://en.wikipedia.org/wiki/Blood) and are deposited in various tissues (typically the [skin](http://en.wikipedia.org/wiki/Skin), [kidney](http://en.wikipedia.org/wiki/Kidney) and [**joints**](http://en.wikipedia.org/wiki/Joint))This may trigger an immune response according to the classical pathway of complement activation. The reaction takes hours to days to develop.  **For Example: -**  Immune complex [glomerulonephritis](http://en.wikipedia.org/wiki/Glomerulonephritis) | These class molecule is present on the T cell of leukocyte as well as on immune thymocite. |

**Q4: Explain complement system, it’s function and also Alternative pathway?**

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| **Complement system** | **Functions of Complement System** | **Alternative Pathway** |
| The complement system consists of approximately 20 proteins that are present in normal human (and other animal) serum.  The term “complement” refers to the ability of these proteins to complement i.e augment the effects of other components of the immune system e.g antibody.  Complement is an important component of our innate host defense. | There are three main functions of complement system **1) Lysis** of cells such as bacteria, and tumor cells.  **2)Generation of mediators** that participate in inflammation and attract neutrophils. **3)Opsonization** i.e. enhancement of phagocytosis. | The alternative pathway are more important because the first time we are infected by microorganism the antibody required to trigger the classic pathway is not present. The alternative pathways are therefore participants in the innate arm of the immune system. |

**Q5. Draw Classic pathway of Complement system in detail?**

The classic pathway is initiated by an antigen -antibody reaction

A specific reactive site on the constant portion of the antibody become uncovered or activated

And this in turn bind directly with the C1 molecule of the complement system. Setting into motion "Cascade" of sequential reaction

Beginning with activation of the proenzyme C1 itself.

The C1 enzyme that are formed then activate successfully increasing quantities of enzyme in the later stage of system, so that from a small beginning, an extremely large amplified reaction occurred

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