Dr. Faiyaz ahmad

Dept. of zoology

L.S college (Mfp.)

Cells of the lymphoreticular system

The cells of the lymphoreticular system consist of structrual cells (reticulum cells, endothelial cells and fibroblasts) and those that subseive specialised immunological function (lymphocytes, plasma cells and macrophages.) their classification into one or the other category may not always be easy as they from a spectrum of cells witn the characteristics of one mergining into those of other , such a classification may also be artificial as cells of the same morphology may not be functionally identical . moreover , at least some of them can transform from one to another depending on the functional needs of the movement.

Lymphocytes: Lymphocytes are small, round cells found in peripheral blood, lymph lymphoid organ and in many other tissues, in peripheral blood, they constitute 20-45 per cent of the leucoytes population , while in lymph and lymphoid organs they from the perdominal cells tyes, the human body contain about 10 power 12lymphocytes - approxmately 10power 9 of them being renewed daily. only about 1% of the total body lymphocytes are present in blood. Ehrich (1879) who introduced a staining technique for blood cells describe lyphocytes as non-motile end cells with no recognisable function. lymhocytes are now reconised to be the major cellular element resepnonsible for immunlogical responses.

According to their size, lymphocytes can be classified into small

(5-8um), medium (8-12um) and large (12-15um) lymphocytes. the small lymphocytes are the most numerous, they consist of a spherical nucleus with prominent nuclear chromatin and a thin rim of cytoplasm containing scattered ribosomes but virtually devoid of endoplasmicreticulum or other organelles, they are capable of low motility and during movement a reticulum or other organelles. They are capable of low motility and during movement assume a 'hand mirror' from with the nucleus in front and the cytoplasm as a tail behind.

Depending on their fifespan, they can be classified as short lived and long lived lymphocytes. In human beings, the short livced lymphocytes have a life span of about two weeks, while the long lived cells may last for three year or more, or even for life . the short lived lymphocytes are the effector cells in immune response, while the long lived cells act as the storehoue for immunological memory. The long lived cells mainly thymus derived.

Lymphopoiesis take place in at least three sites. These are the bone marrow central lymphoid organs and the peripheral lymphoid tissues. These population of lymphocytes do not remain distinct but mix together in a process known as ' lymphocyte reciculation'. There is a constant traffic of lymphocytes through the blood, lymph, lymphatic organs and tissues. This recirculation ensures that following introduction of antigen into any part of the body, lymphocytes of appropriate specificity would reach the site during their ceaseless wandering and mount an immune response. A lymphocyte completes one cycle of recticulation in about 1-2 days. Recirulating lymphocytes are mainly T-cell, B-cell tend to be more sessile. Chronic thoracic duct drainage will, therefore, result in selective T-cell depletion.

Alymphocyte that has been 'educated' by the central lymphoid organs becomes an 'immunologically' competent cell' (ICC). Such cells, through not actiually engaged in an immunologically response, are nevertheless fully qualified to undertake fully qualified to undertake

such a responsibility when appropriately stimulated by an antigen. They subserve the following functions- recognition of antigens, Lymphocytes have antigen recognition mechanisms on their surface, enbling each cell to recognise only one gene. The reaction of an immunocompletent cells specific antigens may be introduction of a tolerance or immune response. The nature immune response depends on whether the lymphocyte is a B or T-cell. Stimulated T-cells produce strain activation products (lymphokinese) and in CMI. While stimulated B-cell divide and trans into plasma cell which synthesise immunoglobulin.

A number of surface antigen or markers has been identified on lymphocytes and other leucocytes by means of monoclonal antibodies. The markers reflects the stage of differentation functional properties of the cells. Thet have been given different designations by the investigation who prepared the antibodies, the same marker to the known by the different name e.g. T4, etc. Order was introduced at the international workshop for leococyte differentation antigen by the comparing the specificities of the different sera. When a cluster of monoclonal antibodies was found to react with a particular antigen. It was fined as a separate marker and given a CD (cluster of differentation) number. Over 80 CD man have been identified so far. (TABLE 16.1) lists some of CD markers, with their cell association previous disignations. (in spite of the CE non-clature, some popular old names contiune to be used- for example, T4 and T8 are still in CD 4(helper / inducer) and CD 8 (supporter / cytoxic) cells.

The most clear cut differentation between Tand B-cells is by their surface markers. For example demonstration of CD3 on T-cells and lg and B-cells. Many other tests help in their differentation.

THESE INCLUDE THE FOLLOWING.

1. T-cell bind to sheep erythrocyte forming rosettes (SRBC or E-

rosette) by CD 2 antigen B-cell do not.

2. B-cell bind to sheep erythrocytes coated with antobody and complement forming EAX resettes, due to the presence of C3 receptor (CR 2) on B-cell surface. This receptor ((CR2) also acts as a receptor for Epstein- barr virus. T-cells do not possess this.
3. B-cells have immunoglobulin on their surface. Each B-cell carries about (10 to the power 5) identicallg molecules on this surface is monomeric lgM. Subsequently . other classes (either lgG, lgA or lgE) may be present , along with LGd. The surface lg on B-cell will have only a single antigen specificity. It, therefore, serves as the antigen recognition unit. T-cells do not have surface lg. Instead they T-cell receptors (TCR) composed of two chains of polypeptides linked to CD 3.
4. T-cell have thymus specific antigens, which are absent on B cells.
5. T-cells undergo blast transformation on treatment with mitogenes such as phytohemagglutinin (PHA) or concanavalin A (Con A). While B-cells undergo similar transformation with bacterial endotoxins, staphylococcus aureus (cowan 1 strain) EB vinis.
6. Viewes under the scanning microscope, T-cells are ganerally free from cytoplasmic surface projections, while Bcells have an extensively filamentous surface , with numerous microvilli.

Cont...