

SURFACE FREE ENERGY OF BLOOD INFECTED WITH HUMAN IMMUNODEFICIENCY VIRUS (HIV) FROM CONTACT ANGLE MEASUREMENTS

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ABSTRACT

The surface free energies of HIV infected and uninfected lymphocytes were studied. Lymphocytes in the blood were chosen because HIV normally targets them for destruction. Blood samples were collected from twenty HIV infected patients and twenty uninfected persons. Through centrifugation, the blood components were separated. The plasma and the lymphocytes were retained and prepared by smearing on glass slides and dried in ventilated room for contact angle measurements using water and glycerol. It was found that HIV infection increased the contact angles on the surfaces of the lymphocytes, making them more hydrophobic. If the surface of the lymphocyte is modified to the extent that the contact angle is reduced, in principle the effect of HIV could be reduced. The surface free energies were calculated from contact angle measured for each liquid using the Neumann and Fowkes models. The average values of surface free energies were used to calculate the changes in free energies of adhesion. The results showed that HIV has the capacity to lower the surface energy of the lymphocyte and thereby weakening it and rendering it incapable of resisting the HIV attack. The change in free energy of adhesion which is high for infected cells gives an idea of the strength of the bond between the HIV and the surface of the lymphocyte. A relationship between the surface free energies of the HIV, lymphocytes and the plasma was derived and shown to exhibit an error limit of about 8% in the evaluation of the surface energy of the lymphocyte.

KEYWORDS: HIV, Lymphocytes, Change in Free Energy of Adhesion, Surface Free Energy & Contact Angle