Suspension Theory—Psychological/ Physiological States

The tissues composing the body can be viewed as cell suspension systems. The various individual tissues organize and coordinate to function as a whole system.

The cells of each local tissue continuously fluctuate between the coagulated and flocculated aggregation states. In addition, blood cells can exist in the dispersed state as separate entities.

By flocculated is meant an aggregation of cells held together by bridging macromolecules in an open network structure. Entrapped in the openings of the network is polar bulk water.

By coagulated is meant an aggregation held together by films of macromolecules that cover the adhering surfaces of closely adjacent cells. The water in which the cells are suspended is bound and forms part of an interstitial structured matrix, which is nonpolar in its solvent properties[1,2].

It was postulated[1] and then shown[3,4] that a direct correlation exists between psychological states and erythrocyte sedimentation rates and, thereby, between psychological states and the red blood cell aggregation state producing the erythrocyte sedimentation rate[5]. The normal emotional state exists with a dynamic equilibrium among the dispersed, coagulated, and flocculated suspension states. Increasing emotional agitation up to the manic state shifts the aggregation equilibrium to a predominately flocculated state. Conversely, the depressed state (manic-depressive) shifts the suspension states to predominately a coagulated aggregation.

If it is assumed that the normal emotional state is the ground state with respect to free energy content, any increase in stress, psychological or physical, produces an increase in matrix structure breakers (catecholamines, *etc.*), which is accompanied by liberation of metabolic energy, *i.e.*, a decrease in enthalpy. There is a corresponding increase in the entropy as reflected in the shift toward a flocculated and dispersed system. Thus, fuel for responding to the stress is at the expense of the free energy content of the total body as well as the local tissues involved. Countervailing conditions toward normal and depressive states are initiated by removal of the stress or prolonged presence of stress with excessive expenditure of the free energy.

The presence of stress is accompanied by rising levels of macromolecules, chiefly albumin, along with the catecholamines.

Removal of stress lowers catecholamine as well as other energy-stimulating hormone production, thereby permitting excess macromolecules to layer out on cell surfaces. Sufficient film production on cell surfaces results in a shift toward coagulation.

Prolonged presence of stress results in depletion of local tissue free energy. The liberation of chemical energy decreases and then ceases. The entropy of the tissue cellular suspensions then becomes increasingly more negative as the cells begin to pack closely together and to form the more structured coagulated state. The coagulated state permits regeneration of free energy and eventually the metabolic processes that start the cycle toward the flocculated state.

In summary, as the manic stage is approached, the change in entropy of the cell suspensions becomes increasingly positive as the change in enthalpy becomes increasingly negative. As the depressed stage is approached, the entropy becomes increasingly negative. With time, the local tissue enthalpy becomes increasingly positive. The local tissue free energy is increased as the by-product of the metabolic processes occurring in the other tissues.

The coagulated state is the state of energy regeneration, growth, and division. Its organization is controlled by the external environment. The flocculated state is the state of energy expenditure and internal control of tissue organization (contact inhibition)[6]. In the extreme case, depression is an energy-rich state, energy that the body cannot liberate. The energy is expended on the tissues of the internal environment. In the manic state, excessive amounts of energy are being expended on the external environment. The body is continually responding to stress with psychological–physiological buffering processes.

Accordingly, after a period of stress, sleep is a process for regenerating reversible thermodynamic states under optimum conditions. In sleep, there is a minimum of external energy-stimulating signals.

In aging, the reversible coagulation–flocculation process proceeds with a slow loss of entropy regeneration and reversibility and, thereby, a loss of ability to organize cell tissue aggregates. The final result is the loss of internal control of body organization and finally death, although individual cells might still live.

The immortality of cancer cells, an irreversible coagulated state, is obtained at the loss of the ability to go to an organized state, *e.g.*, the flocculated state[6].

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