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Early detection of vascular changes in diabetes mellitus by laser backscattering from biological tissues

Megha Singh
SGNE, India

Diabetes mellitus, a problem related to metabolic disorder, has affected a large number of people in various countries. The beginning of this problem is with increase in glucose level in circulation in DM-type II but it affects the functioning of vital organs of human subjects. The changes in blood are associated with changes in micro-hemorheological parameters such erythrocyte deformability and erythrocyte aggregation (1). This also affects the glucose metabolism in erythrocyte membrane. The effect of this of these is to retard blood flow through vascular system. Already affected by the reduction in metabolic activity, the blood flow through vascular system is reduced which in turn reduces the skin temperature above these tissues. Due to this the tissue composition is affected.

Early detection of the tissue changes may help in determining the clinical status of the of the vascular system. By this many precious lives from the advancement of this disorder can be saved. For detection of these changes a laser backscattering is developed. These changes are detected by laser backscattering from the various layers of tissues. Laser light is incident normally on the tissue surface. After multiple scattering in the various layers this emerges on the surface. By processing of this data the tissue images of various layers are reconstructed. By this procedure the affected part of the vascular system is localized and the extent of changes in various layers by gray scale variation is determined. Images developed by this process are sensitive even to onset of this disorder.

msingh_iitm@yahoo.com