Spectral diagnosis of blood disorders

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Blood disorders are group of diseases in the blood; it can affect any of the three main components of blood such as red blood cells, white blood cells and platelets. For example sickle cell anemia and thalassemia, affect mostly red blood cells and hemophilia only platelets. The most common techniques of detection are complete blood cell count, followed by electrophoresis and high performance liquid chromatography etc. These methods involve sophisticated instrumentation and are therefore cumbersome and expensive. An innovative spectral detection method based on the fluorescence spectra of a set of blood plasma biomolecules [tyrosine, tryptophan, nicotinamide adenine dinucleotide (NAD), and flavin adenine dinucleotide (FAD)] and red blood cell (RBC)-associated porphyrin is being evolved by our group. The research so far has exhibited sensitivity and specificity values exceeding 90% based on the spectral features of blood components of 100 thalassemia patients and 50 sickle cell anemia patients and equal number of age adjusted normal controls. Further, other blood disorders like leukemia, hemophilia have spectral features distinctly different from the above mentioned anemia. This technique could be of significant value for detection of blood disorders and also could be adapted for use in small primary health care clinics.

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