

Distinguishing between Bacterial and Viral Infections Based on Peripheral Human Blood Tests using Infrared Microscopy and Machine Learning for Cancer Patients during Chemotherapy

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Fourier transform infrared (FTIR)-spectroscopy has been found useful for monitoring the effectiveness of antibiotics during chemotherapy in cancer patients with bacterial infection, in addition, (FTIR)-spectroscopy was used to identify the infectious agent type as either bacterial or viral, based on an analysis of the blood components [i.e., white blood cells (WBC) and plasma] for cancer patients during chemotherapy.

From the primary results, diagnostic markers (i.e. RNA/DNA ratio and Amide1/Amide2 ratio) were used for monitoring the biochemical changes in WBCs and plasma during antibiotics and chemotherapy was impressive. We can see trends of several markers.

By employing the (FTIR)-spectroscopy of feature extraction with Fisher linear discriminant analysis (FLDA) in order to identify the infectious type, a sensitivity of ~92 % and an accuracy of ~80 % for an infection type diagnosis was achieved.

The present preliminary study suggests that FTIR spectroscopy of WBCs is a potentially feasible and efficient tool for the diagnosis of the infection type.

Biography:

Mr. Adam Hamody Agbaria has completed his M.Sc. Beer-Sheva, Israel. Dept. of Physics, Faculty of Natural Sciences. Supervisors: Prof. Ilana Bar Title of thesis: "Studying Photo dissociation of Molecules by Velocity Map Imaging of Ions via Electrostatic Lenses". He is Ph.D. Candidate in Ben-Gurion University of the Negev, Beer Sheva, Israel. Dept. of Physics, Faculty of Natural Sciences. Supervisors: Prof. Daniel H. Rich, Prof. Shaul Mordechai, Prof. Mahmud Huleihel and Dr. Ahmad Salman in vibration spectroscopy and machine learning.