# *Optimized methodology for investigating cellular drug response of individual live cells using FTIR micro-spectroscopy*

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When a patient is diagnosed with cancer, it is important to choose a treatment that predicts the best prognosis. Sometimes this means choosing a chemotherapeutic agent that an individual's cancer is most likely to respond to, as response to a drug often varies between individuals and cancers. Treatments can be painful, costly and often life threatening. A methodology that would accommodate the testing of potential drug treatments directly to an individual's harvested cancer cells (propagated in culture) would provide a personalized plan for disease treatment tailored to that patient's response. Presented are data reflecting efforts towards personalized cancer treatment.[1]

We present a method to monitor cellular response of live cells based on Fourier transform infrared (FTIR) microspectroscopy. The data represent successful implementation of an in-lab designed live cell chamber[1] capable of sustaining adherent cells during FTIR microspectroscopic measurements for as long as 24 hours[1]. We present data demonstrating the response of live cells exposed to an antineoplastic agent, (cyclophosphamide monohydrate)[2,3,4] which is currently used in the treatment of patients suffering from various cancers, against cells under normal culture conditions. Multivariate analysis methods, such as principal component analysis[5], are used to demonstrate subtle, yet distinct biochemical changes occurring in live cells under normal and perturbed conditions. Also presented are data representing recent changes to our previous methodology[1] in conjunction with newly developed chemometric preprocessing routines resulting in significantly faster data collection, better spectral quality, and noise reduction.

References

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