

***Perspectives of application molecular fiber spectroscopy
to the determination of the metabolic changes in biochemical fluids
during endurance training***

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Human saliva is known as unique object of fundamental and applied medical research and diagnostic tests [1]. Correlations between various physiological disorders and the functional activity of the salivary glands have led some researchers to consider them to be a mirror of disease [1, 2]. A wide range of biomarkers is measurable in saliva [1, 3-5]. Saliva collection is non-invasive compared to others and can reflect real-time level of biomarkers [1]. Analysis of the physiological effects of stress-including factors is one of the most interesting fields of psychological research.

We focus view on stress due to physical training and have analyzed numerous saliva samples from professional athletes.

Fourier-infrared (FTIR) spectrometry has been used to determine exercise-induced specific changes in relation of training loads and comparison with biochemical analysis. IR-spectra of saliva were recorded before and after sporting using the fibre optical technology. Analysis was done by calculation of difference spectra (rest bio-fluid spectrum subtracted to exercise bio-fluid spectrum). IR-difference spectra clearly show the influence of physical stress. This technique will provide a “discriminatory bio-molecular profile” to differentiate individuals of their physiological status. A specific application of this methodology is to perform longitudinal health monitoring in athletes.

We have demonstrated the successful operation of our unique fiber probes and sensors in conjunction with the FTIR method.

The present study has demonstrated that new way including surgery FTIR spectrometry with fiber optic probes is useful tool for determination metabolic changes in saliva at the molecular level in stress and training.

Keywords: Fourier Infrared spectroscopy, fiber optic probe, noninvasive technologies, saliva

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