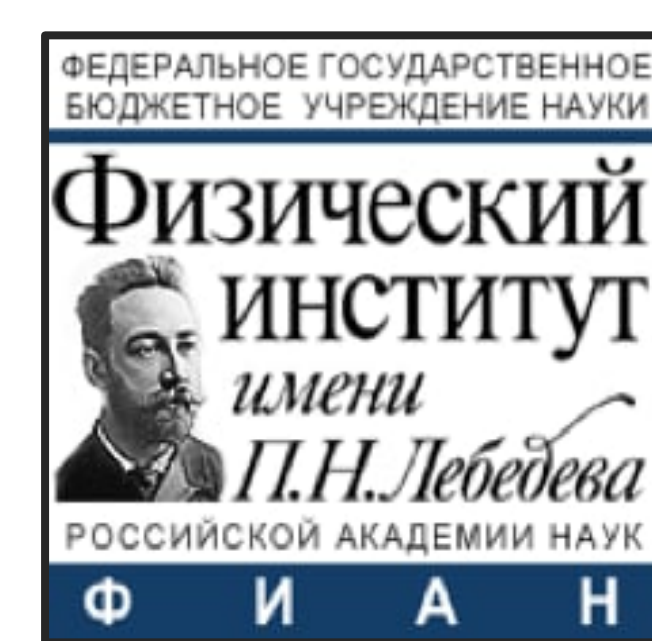


DETECTION OF PHARMACEUTICALS PROHIBITED IN SPORTS BY RAMAN SPECTROSCOPY METHODS



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INTRODUCTION

The study of the properties and pharmacokinetics of pharmacologically active compounds directly inside biological tissue or liquid is carried out using various methods: optical and chromatographic. In the case of the latter, the integrity of the sample section is violated, which can negatively affect the quality of the experiment itself, and in some cases, the reliability of the results. Vibrational spectroscopy methods, in particular Raman spectroscopy, are known to be non-contact and non-destructive.

In accordance with the World Anti-Doping Code, any content of prohibited substances in athletes' food, as well as storage in personal belongings and receipt from third parties is prohibited.

Qualitative analysis of drug samples introduced into a living organism or a fragment of biological tissue is important for the creation and research of new drugs, the development of drug delivery methods and other applications of biophotonics.

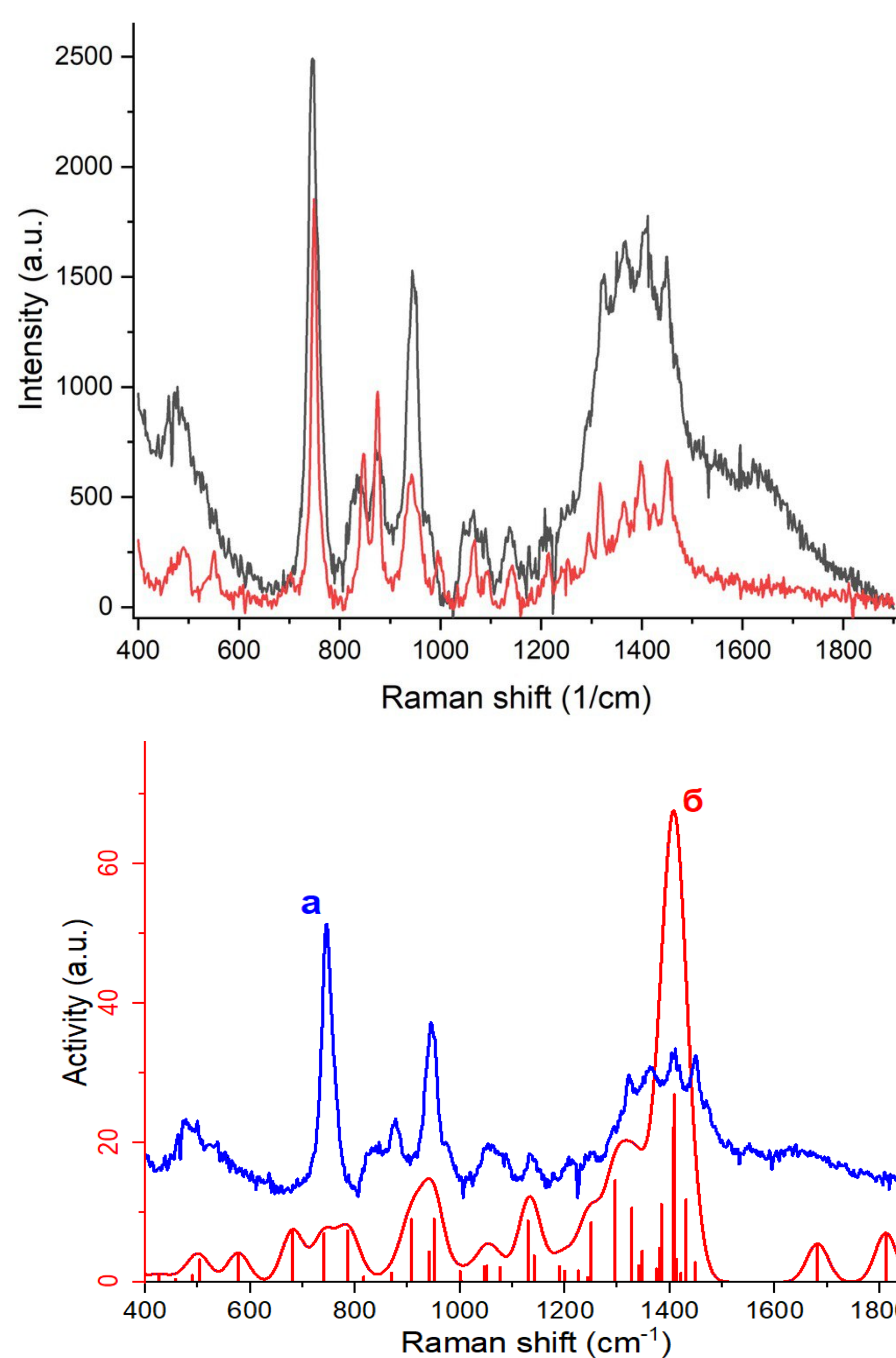
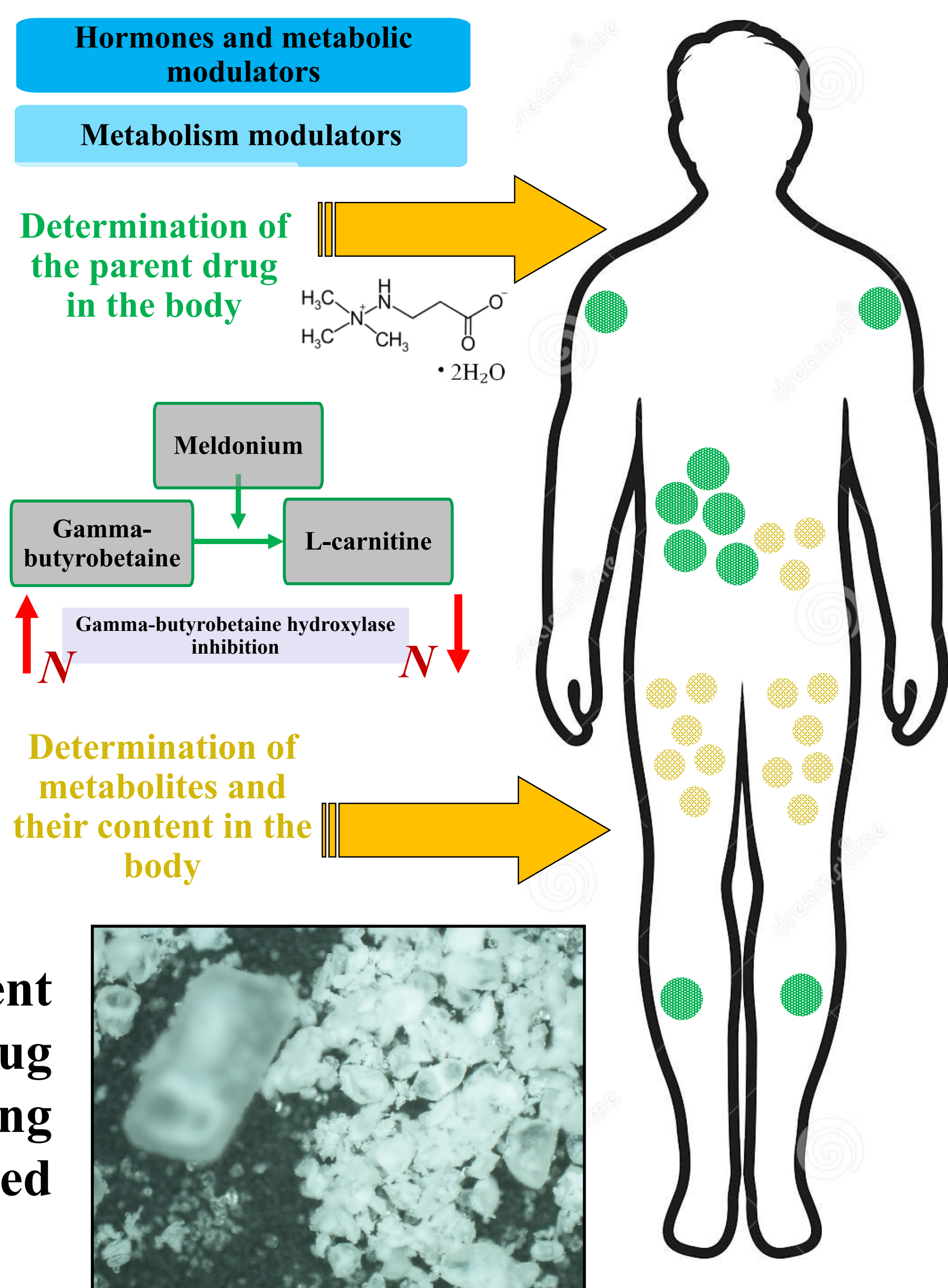
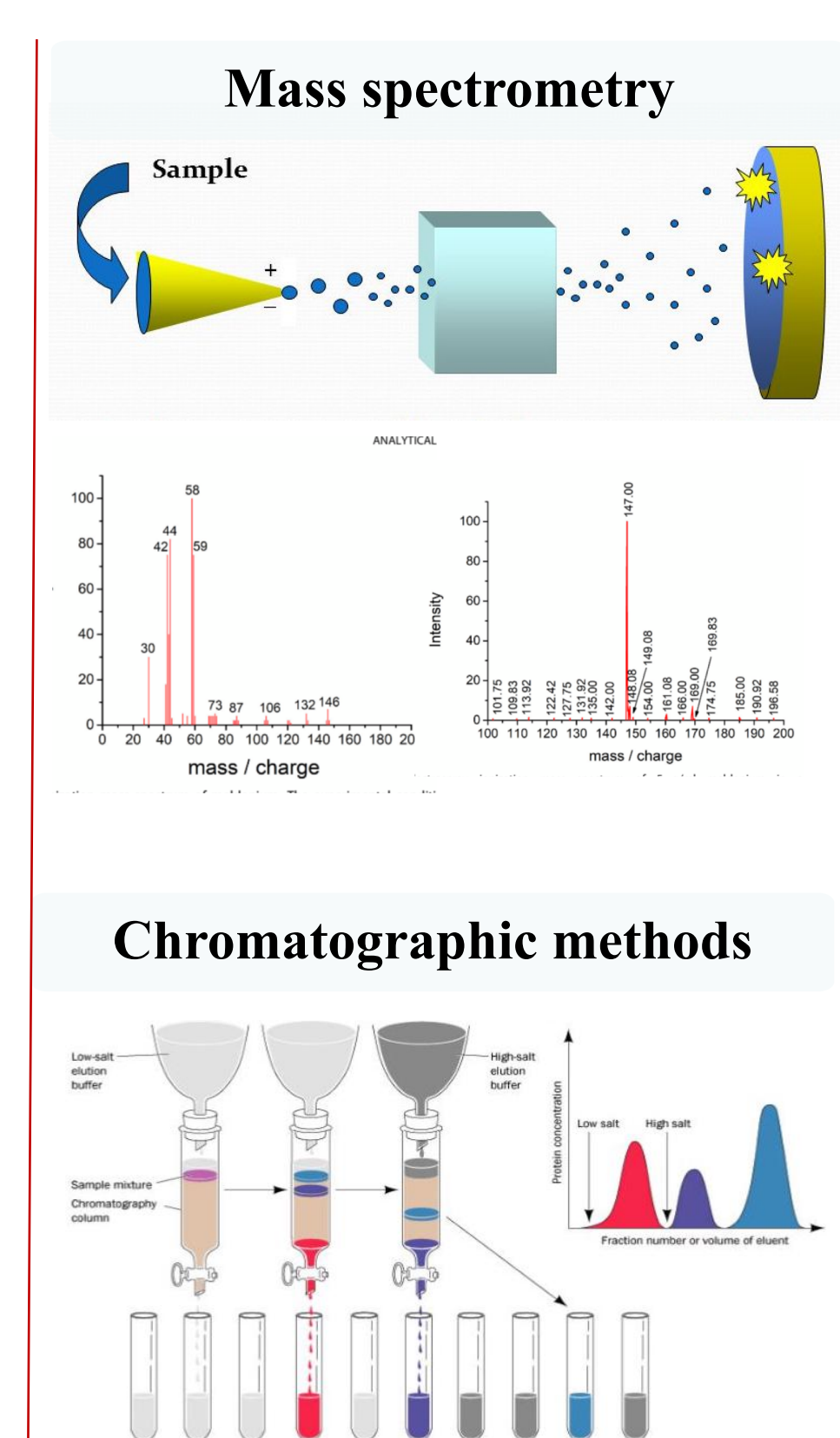
Including all optical isomers and other substances with similar chemical structure and similar pharmacological effect.

Traditional methods are known to be labor intensive, expensive and destructive to the sample.



OBJECTS AND TRADITIONAL METHODS

OPTICAL METHODS: RAMAN SPECTROSCOPY



When measuring samples with a molar concentration of meldonium from 0.5 mol/l - 0.01 mol/l using Raman scattering, clear characteristic lines were obtained at 744, 876, 944, 1410 cm^{-1} [2], which also correlates well with results of other researchers.

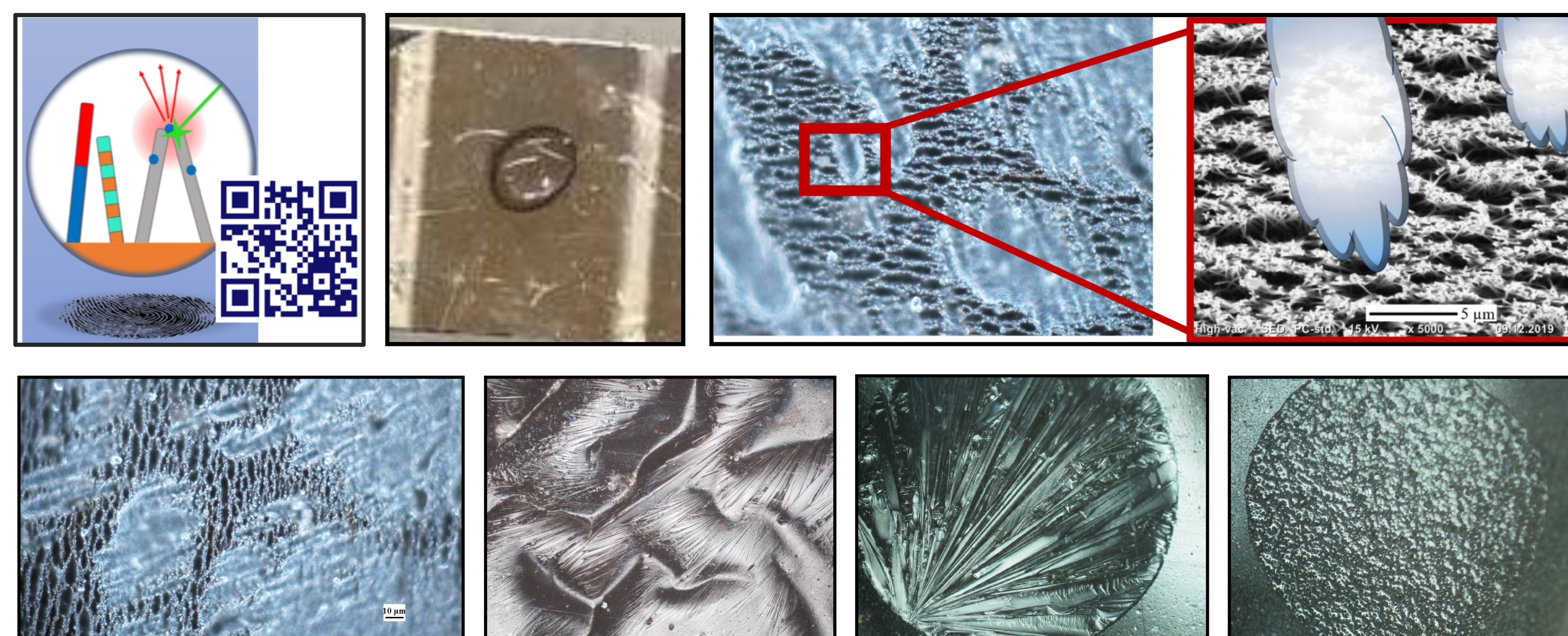
We measured meldonium by Raman scattering, characteristic bands around 744, 876, 944, 1410 cm^{-1} are identified in the spectra of samples with meldonium, which also correlates well with the results of other researchers. The wavelengths of the spectral bands in the experimental Raman spectra correspond to the calculated data obtained using the ORCA 5 software package [2].

The experiment examined the drug Mildronate, containing the active synthesized substance meldonium.

Belongs to the category of myocardial cytoprotectors aimed at optimizing energy production processes due to oxidative processes in mitochondria. The deposition of meldonium in the bloodstream and muscle tissues of a living organism makes it possible to determine the distribution of this drug in the body.

Measurement of the concentrations of chemical compounds in physiological fluids is carried out using high-performance liquid chromatography with high-resolution tandem mass spectrometric detection, which is difficult when studying muscle tissue of a living organism. This compound does not contain chromophore groups, which makes the use of UV spectroscopy or fluorescence methods ineffective.

STUDY OF THE DISTRIBUTION OF MELDONIUM ON SERS SUBSTRATES



LITERATURE

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