Variation of Quadrupole Splitting in Modified Oxyhemoglobin: A Mössbauer Effect Study

M. I. Oshtrakh[a], O. B. Milder[a,b], V. A. Semionkin[a,b], A. L. Berkovsky[c], M. A. Azhigirova[c], E. P. Vyazova[c]

[a] Division of Applied Biophysics, Faculty of Physical Techniques and Devices for Quality Control, Ural State Technical University, Ekaterinburg, 620002, Russian Federation

[b] Faculty of Experimental Physics, Ural State Technical University, Ekaterinburg, 620002, Russian Federation

[c] Hematological Scientific Center of the Russian Academy of Medical Sciences, Moscow, 125167, Russian Federation

Reprint requests to Dr. M. I. O.; Fax: +7 (3432) 74-38-84;
E-mail: oshtrakh@mail.utnet.ru or oshtrakh@soek.erl.e-burg.su

Z. Naturforsch. **55 a,** 193–198 (2000); received September 11, 1999

Presented at the XVth International Symposium on Nuclear Quadrupole Interactions, Leipzig, Germany, July 25 - 30, 1999.

Human adult hemoglobin modified by both pyridoxal-5'-phosphate and glutaraldehyde in the oxy-form was studied by Mössbauer spectroscopy. Mössbauer spectra were measured at 87 and 295 K (hemoglobin in lyophilized form) and at 87 K (hemoglobin in frozen solution). The values of the quadrupole splitting for modified oxyhemoglobin were found to be lower then those of oxyhemoglobin without modifications in lyophilized form and frozen solution, respectively. The Mössbauer spectra of modified oxyhemoglobin were also analyzed in terms of the heme iron inequivalence in α- and β-subunits of the tetramer. Differences of the tendencies of temperature dependencies of quadrupole splitting for modified and non-modified oxyhemoglobin in lyophilized form were shown.

Key words: Hemoglobin; Mössbauer Spectroscopy; Quadrupole Spitting.