Abstract for the 7: YUCOMAT 2007, the 9th annual conference of the Yugoslav Materials Society, Herceg Novi, Montenegro. Sept. 10-14, 2007, http://www.yu-mrs.org.yu/

# NANOMEDICINE PERFORMED WITH THE ATOMIC FORCE MICROSCOPE ON HUMAN RED BLOOD CELLS

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Atomic force microscopy can yield valuable information concerning basic physical properties as well as alterations of human red blood cells due to environmental factors. Erythropoietin is a hormone that is naturally produced in the kidney to stimulate the growth of red blood cells. Administration of genetically engineered synthetic erythropoietin stimulates the production of even more red blood cells. Therefore erythropoietin is used in doping in serious sports. In this study, differences in the structure and stiffness of red blood cells which are produced body own or with synthetic erythropoietin were investigated for several nanomechanical properties. The samples were prepared via standard methods, and atomic force spectroscopy with trigger forces of three micronewtons was performed in ambient air. The penetration depth does not reveal statistically relevant differences in the two types of red blood cells. Furthermore, cells with a penetration depth four times as large as healthy ones were encountered. In this case, the atomic force microscope served as a nanomedical tool and revealed a rare type of diabetes in the donor of that sample.