

## A study of LDL lipoprotein with Atomic Force Microscopy (AFM) in plasma of children with Juvenile Idiopathic Arthritis (JIA)

Sgouropoulou Vasiliki

Chronic inflammation has been related to increased risk for cardiovascular diseases in patients with Rheumatoid Arthritis (RA), due to atherogenic, structural alterations in low density lipoprotein (LDL) particles. Children with Juvenile Idiopathic Arthritis (JIA) present with atherogenic lipid profile. The aim of the present study was to observe LDL particles in plasma of children with JIA, with the use of Atomic Force Microscopy (AFM), which is an instrument able to provide nanometer-scale resolution images and it has been used for the examination of biomolecules in various cases in biology-biomaterial research. Blood EDTA plasma was obtained from 6 children with JIA, divided into two groups, according to the severity of the disease (1<sup>st</sup> group without disease activity and 2<sup>nd</sup> group with disease activity). LDL were isolated by sequential ultracentrifugation at 10°C in 55,000rpm for 3 hours, using a Beckmann XL-90 ultracentrifuge (75Ti rotor). Experiments were performed on two smooth and clean substrates of different hydrophobicity (glass and c-Si). Samples were rinsed gently, substrates were dried and AFM measurements were performed with Solver P47H Pro (NT-MDT). After initial observation, samples were frozen in -80°C for a week and observed again. Macroscopically, LDL particles formed aggregations in a dendroid layout. There were no differences between images taken from both substrates. Frozen samples presented significantly smaller LDL particles, than fresh ones. Children with active JIA had smaller diameter of LDL particles than those with remission of the disease. In the group of children with disease activity is observed higher percentage of small dense – sdLDL than the other group (84,4% versus 68,8%).