

ABSTRACT

This PhD thesis in essence rounds off the range of queries asked several years ago when the task was set by Doc. RNDr. Zdenek Horak, PhD. The original isolation procedure for polyethylene wear particles, identification of some of their physico-chemical properties and manipulation accordingly has been successful in the process of this thesis accomplishment. It became possible to quantify the particles at relative as well as absolute scale. The thesis managed to disprove the published opinion that centrifugation can affect the morphology of isolated particles. The issue of distribution of polyethylene wear particles around hip endoprosthesis has been solved at two levels: “macroscopically”, the distribution of wear particles in zones around endoprosthesis was showed (this thesis does not include these data). Furthermore, at the „microscopic“ level, the distribution of wear particles in granuloma tissue from the zones surrounding endoprostheses with most particles has been determined. The granuloma tissue formed in zones with most particles because of that. It was observed that the common term - osteoaggressive granuloma - used by orthopedist is rather misguided. Granuloma is not aggressive to bone tissue. On the contrary, the granuloma formation reduces the effective amount of wear particles with negative biological properties. The whole project has been sealed by possible explanations of biological activity wear particles. Since the very beginning it has been exciting to find out if wear particles can present some antigens themselves (as fragments of polyethylene chains) or vicariously. Both alternatives remain possible; however, it seems that the vicarious activity is the one more likely. There proteins adsorb on particles and become denaturated. Because of this fact adsorbed and denaturated endogenous proteins may be recognized as foreign ones.