

Abstract

Recently, carbon nanomaterials gain attention especially for their interesting, often unique, properties. They can be used in wide range of applications, such as electronics, optics, cosmetics, solar cells, construction materials, air filters, polishing materials, protective coatings and dry lubricants. Whereas their physical and chemical attributes have already been intensively examined, the research on their effects on living organisms is still at the preliminary stage. This work is focused on the interactions of carbon nanomaterials, namely graphene, fullerene, carbon nanotubes and nanodiamonds, with bacterial cells and their antibacterial and antiadhesive properties. The mechanisms of the toxic action of carbon nanomaterials against bacteria include damage of outer cell structures as a consequence of the direct contact with a nanomaterial, impairment of bacterial metabolism or reactive oxygen species production. Exact understanding of the processes that take place between bacterial cell and carbon nanomaterials can contribute to the research on their medical applications and ecological recycling in the future.