

MOLECULAR NANOTECHNOLOGY

Loboduk Marina – Sumy State University, group FE01

Adviser Aleksakhina T.A.

Molecular nanotechnology (MNT) is a technology based on the ability to build structures to complex, atomic specifications by means of mechanosynthesis.

Mimicking nature is a recurring theme in nanotechnology and molecular nanotechnology, inspired by the natural nanostructures found in our own bodies, offers many exciting potential outcomes.

One proposed application of MNT is so-called smart materials. This term refers to any sort of material designed and engineered at the nanometer scale for a specific task.

This is the idea of self-healing structures, which would repair small tears in a surface naturally in the same way as self-sealing tires or human skin.

This is medical nanorobotics or nanomedicine, an area pioneered by Robert Freitas in numerous books and papers. The ability to design, build, and deploy large numbers of medical nanorobots would, at a minimum, make possible the rapid elimination of disease and the reliable and relatively painless recovery from physical trauma. Medical nanorobots might also make possible the convenient correction of genetic defects, and help to ensure a greatly expanded healthspan. However, mechanical medical nanodevices would not be allowed (or designed) to self-replicate inside the human body, nor would medical nanorobots have any need for self-replication themselves since they would be manufactured exclusively in carefully regulated nanofactories. A fear exists that nanomechanical robots (nanobots), if designed to self-replicate using naturally occurring materials (a difficult task), could consume the entire planet in their hunger for raw materials, or simply crowd out natural life, out-competing it for energy.