

Amarnath Maitra

Nanotechnology and nanobiotechnology—are they children of the same father?

ABSTRACT. Nanotechnology and nanobiotechnology are often assigned to the same area of science because both involve nanosized materials. Nanobiotechnology is most often defined as a derivative of nanotechnology. In this article I assert that they are completely different branches of science. Nanotechnology is principally the study of physical properties of entities, which are dominated by the surface atoms causing the conduction band electrons to be relatively confined. The electrical, magnetic, optical, mechanical and thermal properties of surface atom-dominated entities such as ultranano thin films, nanowires and nanodots are different from those of bulk entities because of the electron confinement. On the other hand nanobiotechnology is a branch of science that involves specific functions of cells through the uptake of nanosized materials of size range 10–100 nm diameter via pinocytosis and release of the entities inside a particular organelle of a cell. Nanomedicine is directly derived from nanobiotechnology and is concerned with the cellular uptake of nanosized therapeutic agents by pinocytosis; the agent cures or kills the diseased cell and thus cures the disease. The physical properties of the nanoentities, like superparamagnetism, surface plasmon resonance, quantum confinement etc. can also be studied in nanobiotechnology after the entities enter the cells via pinocytosis.

Nanotechnology Perceptions 6 (2010) 197–204

Nonsubscribers: [purchase individual article](#)