

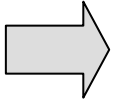
Appendix III

Biotechnology und Nanotechnology – Definitions and examples

The following examples are designed to help you identify your company's research activities in the field of biotechnology and nanotechnology.

You are asked to provide a % estimate of how much of your company's total in-house R&D expenditure in Switzerland is devoted to biotechnology and nanotechnology (100% = position 245, Section B).

I. Biotechnology



Biotechnology is the application of S&T to living organisms as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.

Examples of biotechnology-related activities

DNA (coding):

genomics, pharmaco-genetics, gene probes, DNA sequencing/synthesis/amplification, genetic engineering.

Proteins and molecules (functional blocks):

protein/peptide sequencing/synthesis, lipid/protein glyco-engineering, proteomics, hormones and growth factors, cell receptors/signalling/pheromones.

Cell and tissue culture and engineering :

cell/tissue culture, tissue engineering, hybridisation, cellular fusion, vaccine/immune stimulants, embryo manipulation.

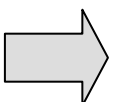
Process biotechnologies:

bioreactors, fermentation, bioprocessing, bioleaching, biopulping, biobleaching, biodesulphurisation, bioremediation and biofiltration.

Sub-cellular organisms:

gene therapy, viral vectors.

II. Nanotechnology



Nanotechnology refers to research, development and eventually the production of products which use materials engineered at the atomic, molecular or macromolecular levels, in the length scale of approximately 1 - 100 nanometre range. Nano-science refers to the fundamental understanding of phenomena and materials at the nanoscale. On a larger scale, nanotechnology research and development includes the controlled manipulation of nanoscale structures and their integration into larger material components, systems and architectures.

Examples of nanotechnology-related activities

Development of carbon nano tube (CNT) laminates, structures and devices
Manufacture of high temperature CNT composites
Low power CNT electronic components
New materials based on SiC, GaN
Develop materials for sensing and monitoring structural health
Design and fabrication of self-healing materials
Development of multifunctional CNT structures
Devices using quantum dots
Pyro-electric micro-thrusters
Some deployment of super micro-electro mechanical systems (MEMS)
Testing of nano sensors
Testing and use of nano coating and materials
Tech transfer of information from Human Genome Project to create biological approaches to nanotechnology
Assembly of micro-mirror arrays
Quantum navigation sensors
CNT vibration sensors for propulsion diagnostics