



## Mains Practice Question

**Q.** What do you understand by nanotechnology and how is it helping in the health sector? (UPSC GS-3 Mains 2020)

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### Approach

- Define what is nanotechnology
- Discuss the applications of nanotechnology in the health sector.
- Conclude suitably.

### Introduction

Nanotechnology is a field of research and innovation concerned with building 'things' - generally, materials and devices - on the scale of atoms and molecules. A nanometre is one-billionth of a meter.

The ideas and concepts behind nanoscience and nanotechnology started with a talk entitled "There's Plenty of Room at the Bottom" by physicist Richard Feynman in 1959. However, it wasn't until 1981, with the development of the scanning tunneling microscope that could "see" individual atoms, that modern nanotechnology began.

### Body

#### Applications of Nanotechnology in the Health Sector

- **Effective Drug Delivery:** One application of nanotechnology in medicine currently being developed involves employing nanoparticles to deliver drugs, heat, light, or other substances to specific types of cells.
  - For example, a team of scientists has created a nanomicelle that can be used for effective drug delivery to treat various cancers including breast, colon, and lung cancer.
- **Diagnostic Techniques:** Research in Nanotech is being done for using antibodies attached to carbon nanotubes in chips to detect cancer cells in the bloodstream.
- **Antibacterial Treatments:** Researchers at the University of Houston are developing a technique to kill bacteria using gold nanoparticles and infrared light. This method may provide a possible solution of the growing problem of antibiotic resistance.
- **Cell Repair:** Nanotech research involves the use of manufactured nano-robots to make repairs at the cellular level.
  - Nanorobots could actually be programmed to repair specific diseased cells, functioning in a similar way to antibodies in our natural healing processes.

### Conclusion

The use of nanotechnology in the field of medicine could revolutionize the way we detect and treat damage to the human body and disease in the future.

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