NANOTECHNOLOGY & IT'S APPLICATION IN VETERINARY & ANIMAL SCIENCE

DEPARTMENT OF ANIMAL NUTRITION

NANO TECHNOLOGY:-

- It is the study of controlling & manipulating matter on an atomic or molecular scale.
- It deals with structures the size of 100 Nano meters or smaller in at least one dimension.
- Very diverse Technology & has potential to change the world.

TYPES OF NANO PARTICLES:-

- Naturally - Viruses
  - Sea spray
  - Mineral composite
  - Volcanic ash
- Incidental - Cooking smoke
  - Diesel exhaust
- Engineered - Metals
  - Quantum dots
  - Bucky balls

Advantages:- **1.**Time controlled

2. Spatially targetted

3. Self regulated

4. Remotely regulated

5. Pre-programmed

Applications:- **1.**Anti microbial property

2. Early detection of cancer

3. Imaging of Nano particles

4. Quantum dots of cancer detection

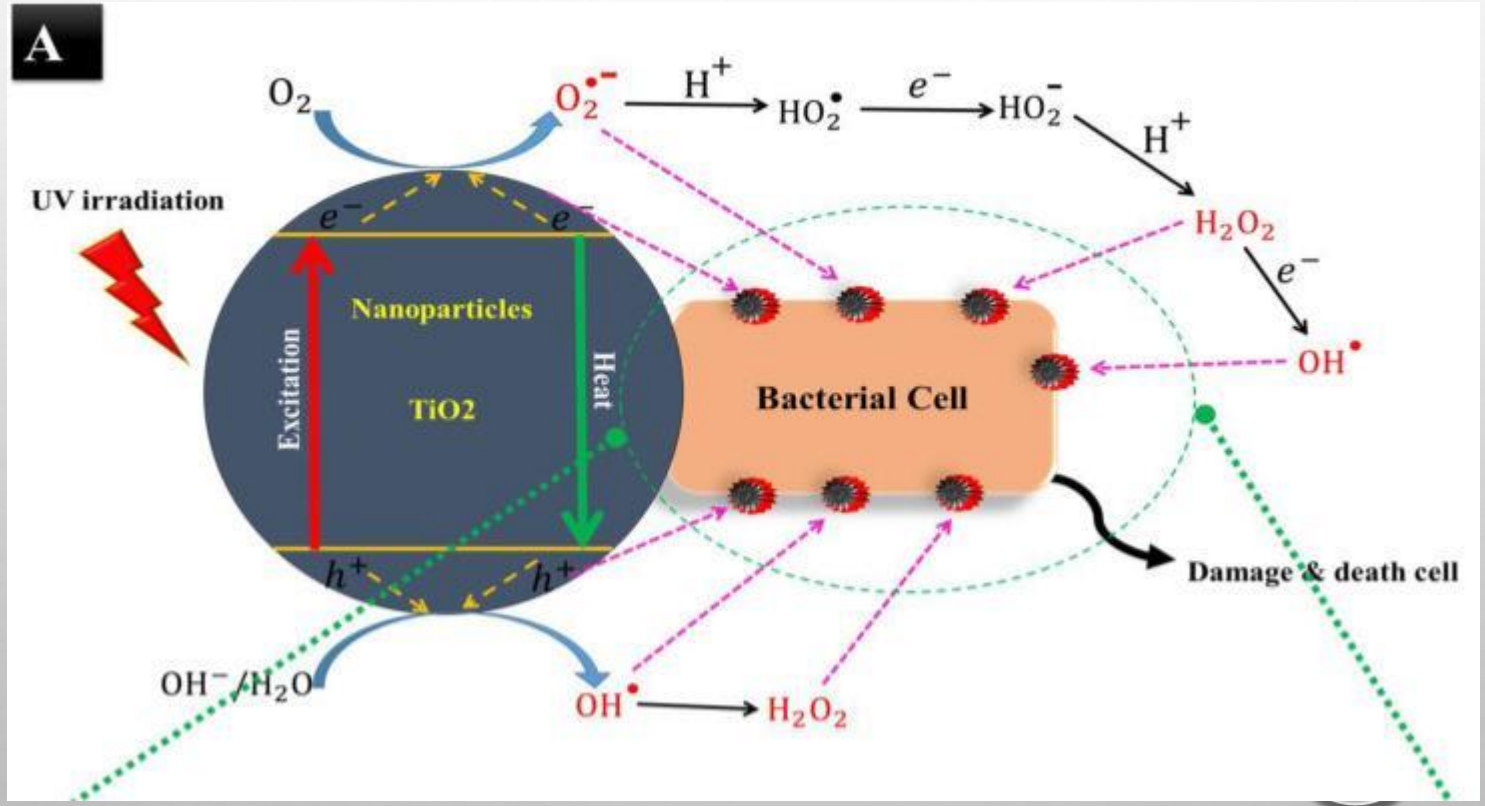
5. Hybridized DNA

6. Nanobar code

7. Nano chips

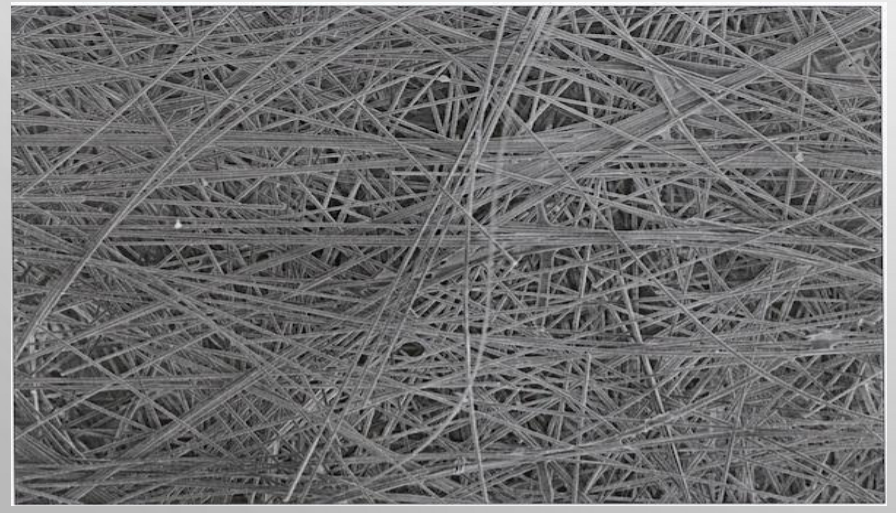
ANTI-MICROBIAL PROPERTY:-

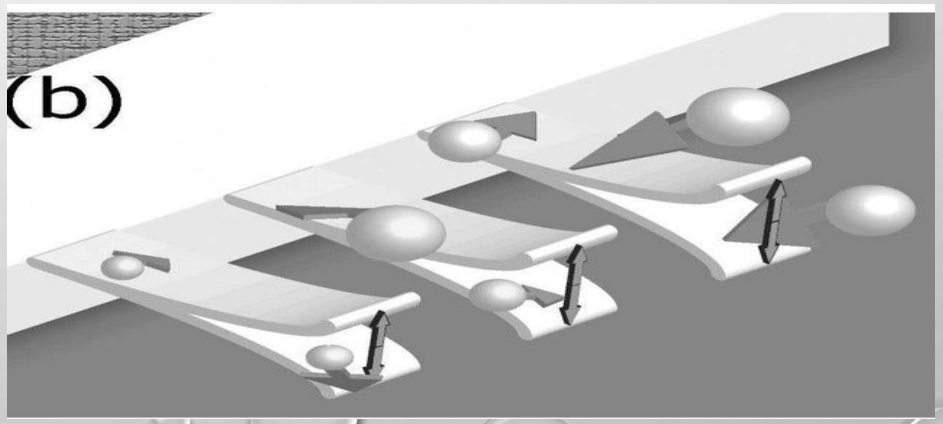
- Silver nano particles show efficient anti microbial property compared to other salts.
- Most effective on E-coli,S.aureus,Klebisella,Pseudomonas.
- Non- particle preferably attack on respiratory chain,cell division leading to death.
- **STEM:-** Confirms presence of silver in the cell membrane & inside bacteria.



EARLY DETECTION OF CANCER:-

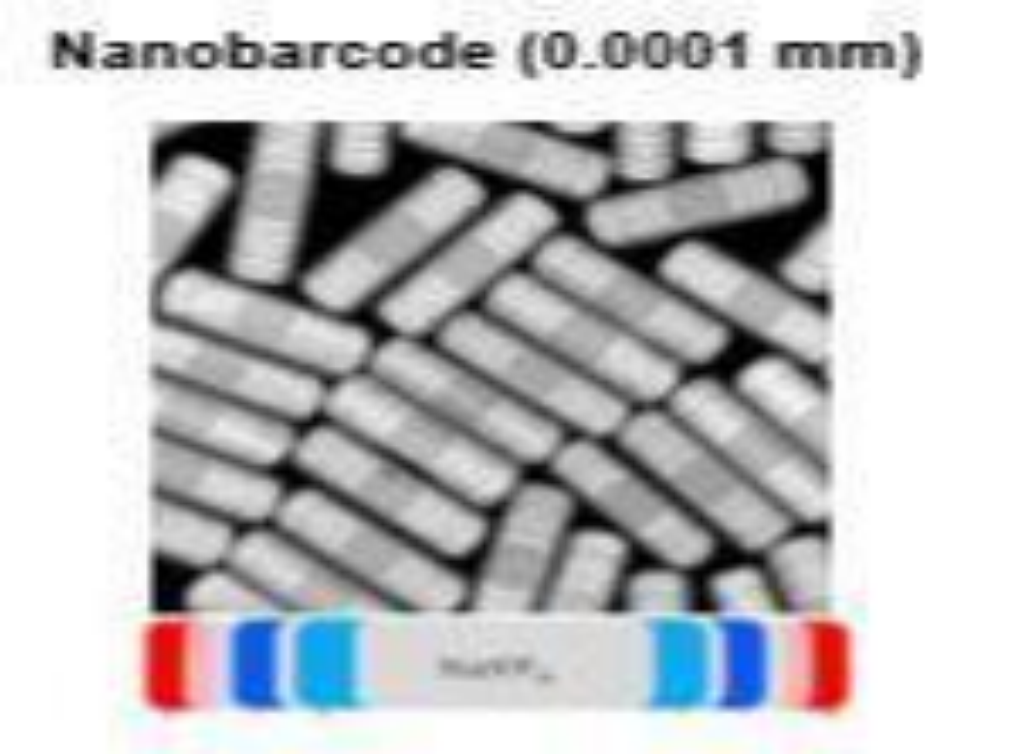
- Current systems are limited by their selectivity & efficiency to concentrate rare cells for molecular assays.
- Nano cells can detect circulating cancer cells which present often 1-2 cells per mm of blood.
- Bionanobar codes,Nanocantilevers,Nanowires are used for promising technologies.





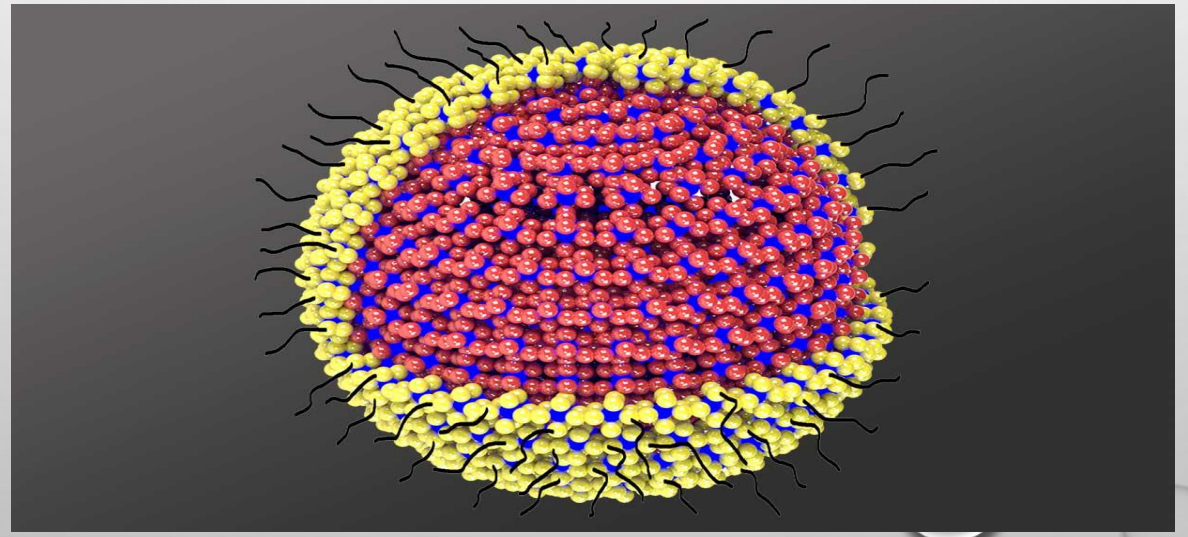
NANO BARCODE:-

- Cancer cell detection.
- Protien & nucleic acid detection based on barcode.
- Hybridized bar codes on DNA are removed.
- Bar codes are detected by colorimetric method.



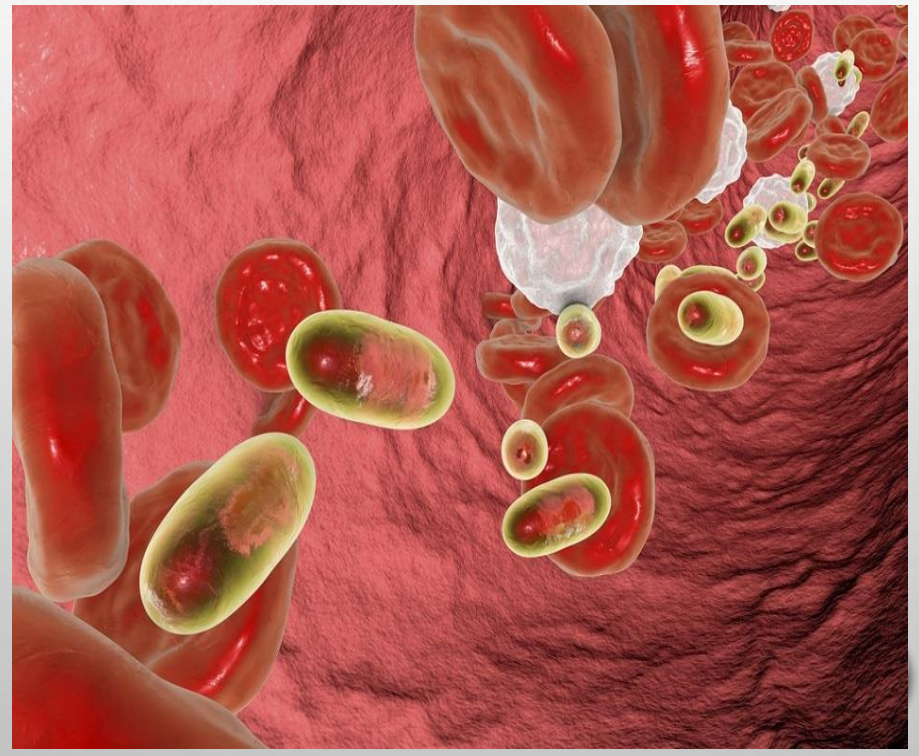
QUANTUM DOTS:-

- Quantum dots staining provides localization information.
- This probes are delivered to tumors by passive targeting mechanism & active targeting mechanism.
- For active tumor targetting used antibody conjugated quantum dots to target a specific membrane antigen.
- Used also in cancer detection.



SMART DRUG DELIVERY SYSTEM:-

- Development of smart treatment delivery systems on nano scale uses similar concepts at molecular level.
- It contain small,sealed packages of drug to be delivered.
- Packages are not opened until they reach desired location i.e.,sites infection.



HYBRIDIZED DNA FLOUROSCENCE:-

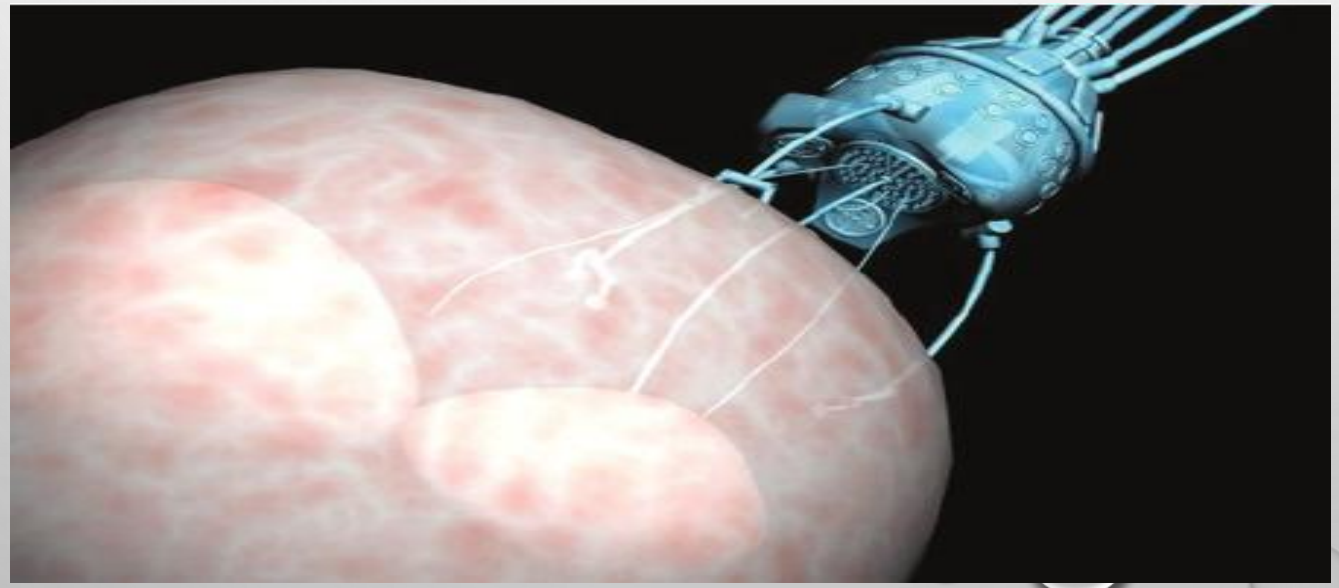
Detect an relayed back to an on board system through platinum wiring.

NANO CHIPS:-

Employs the power of electronic current that seperates DNA probes to specific site based on charge & size

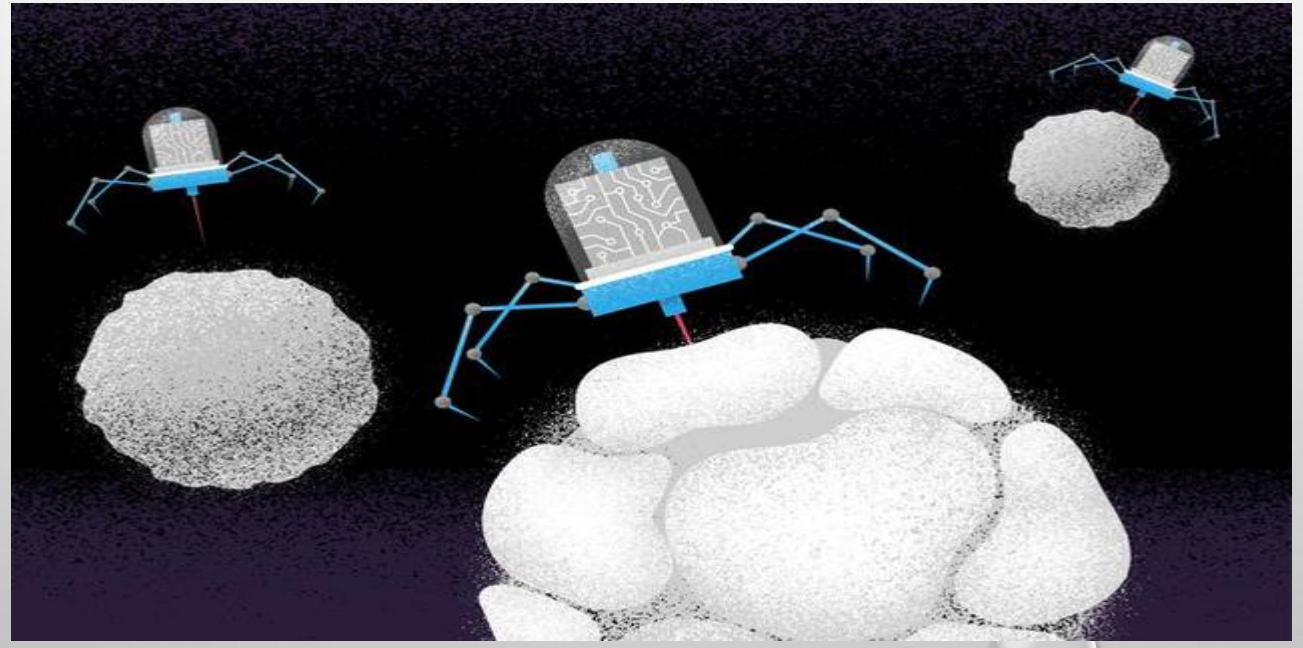
APPLICATION IN SURGERY:-

- Instead of damaging a large animal body,these instruments would be precise & accurate, targetting only area where surgery should be done.
- Visualisation of surgery can be improved.
- Less chance of mistakes or faults.
- Surgery can be done on tissue genetic & cellular levels.



APPLICATION IN MEDICAL ROBOTICS:-

- Early diagnosis
- Targeted drug delivery for cancer
- Monitoring diabetes
- Health care



APPLICATION TO ANIMAL HEALTH:-

- Nanotechnology application in molecular biology, biotechnology & almost all disciplines of veterinary & animal sciences.
- Excellence in animal health & production can be achieved by translation of newer technology to create effective services.
- Ability to manufacture & manipulate maths on the non scale has offered oppurtunities for application in diverse areas of animal sciences.
- Nano censor,Nano vaccines, adjuvants,gene delivery & smart drug delivery.
- Disease diagnosis
- Treatment
- Animal nutrition
- Animal breeding, reproduction & tissue engineering
- Drug discovery
- Adds value to animal products

THANK YOU