Lec 7 \ Biosensor

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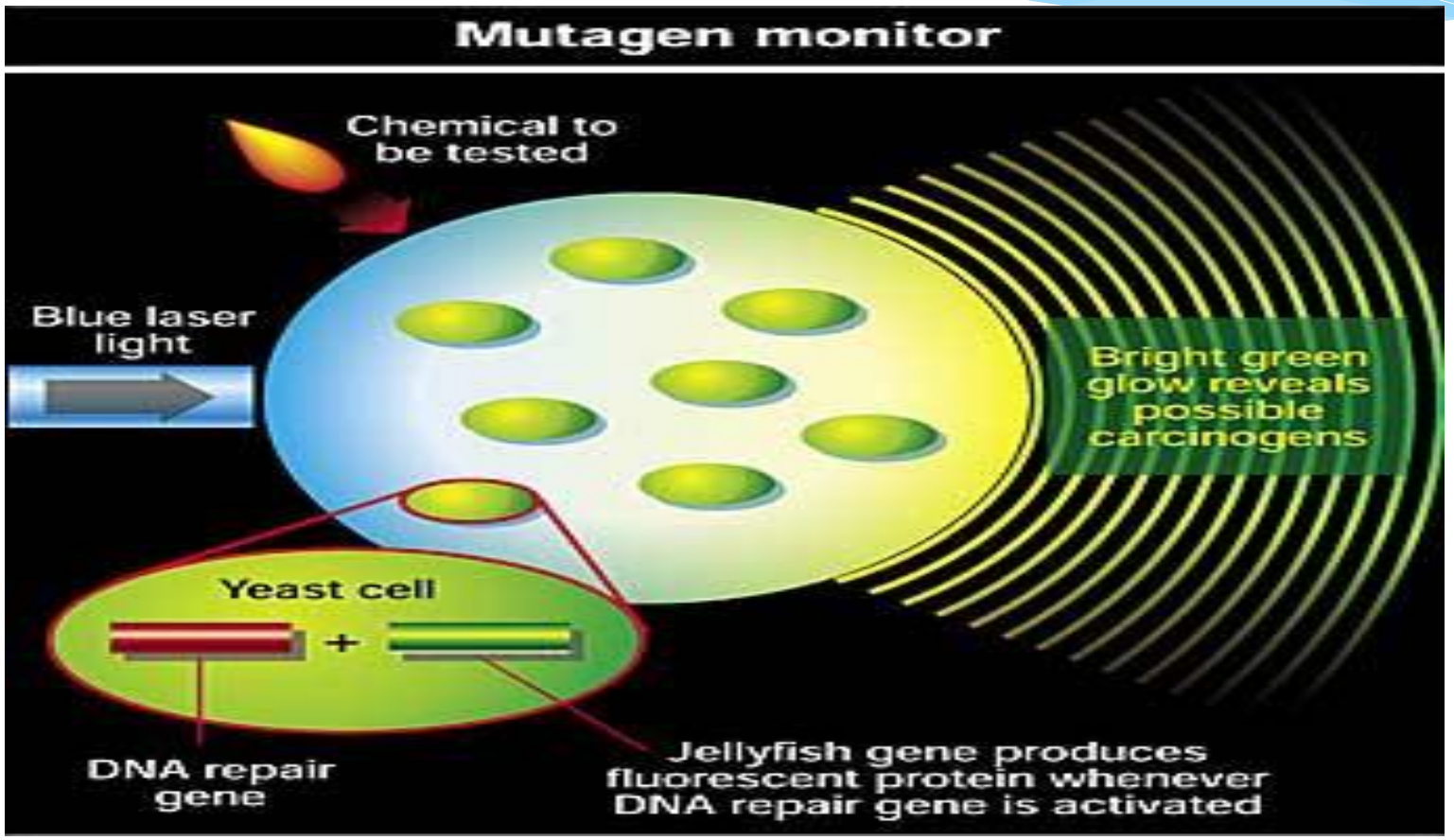
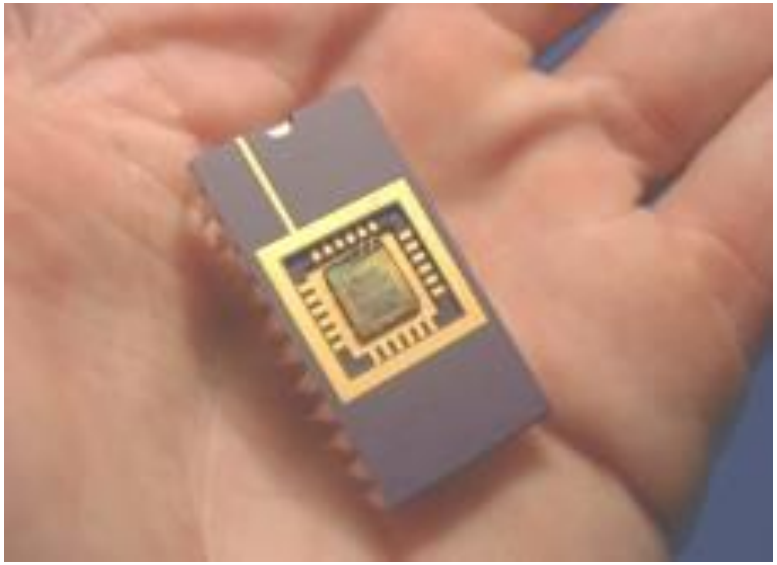
"**Biosensor" –** Any device that uses specific biochemical reactions to detect chemical compounds in biological samples.

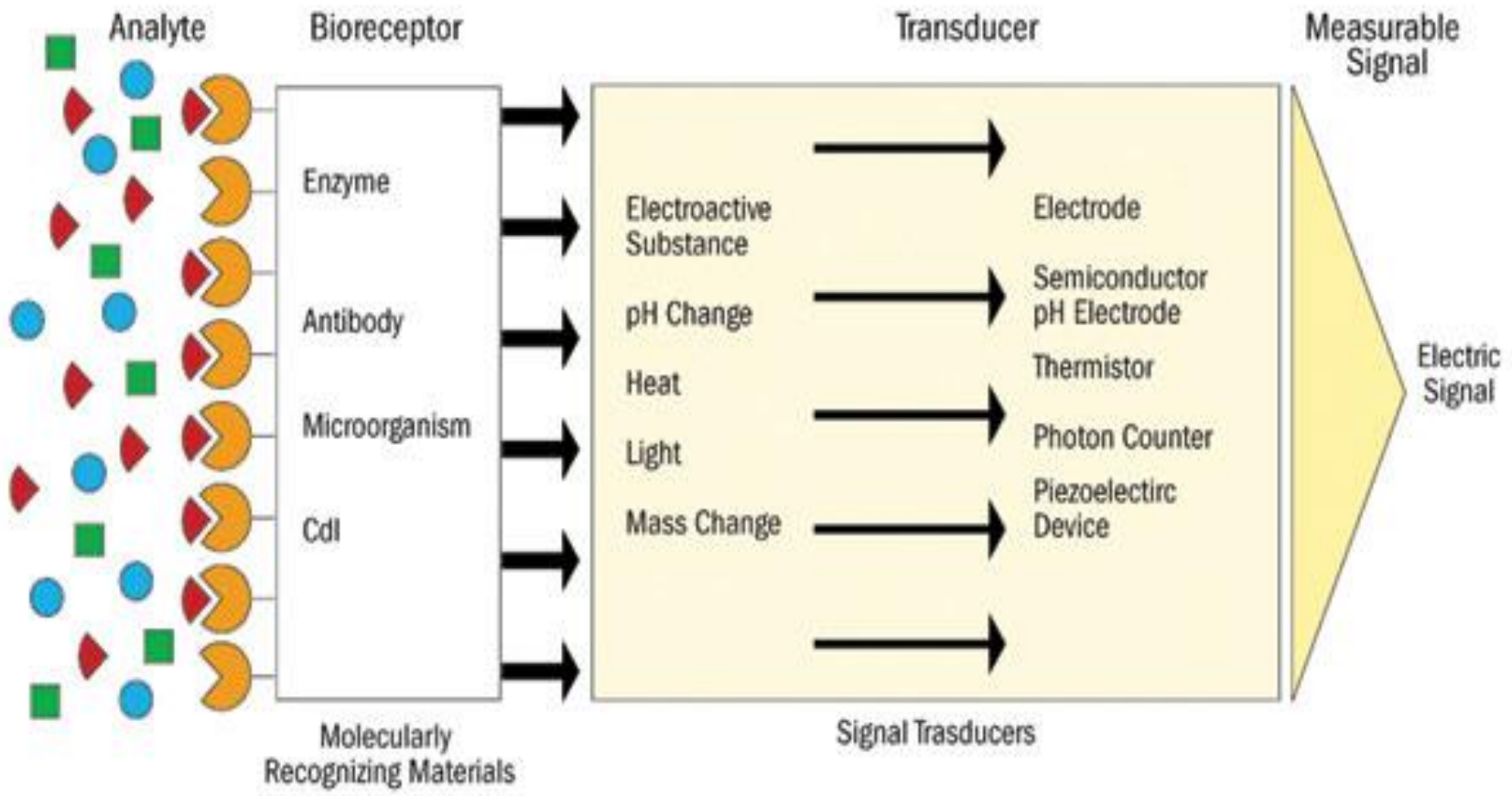


Current Definition

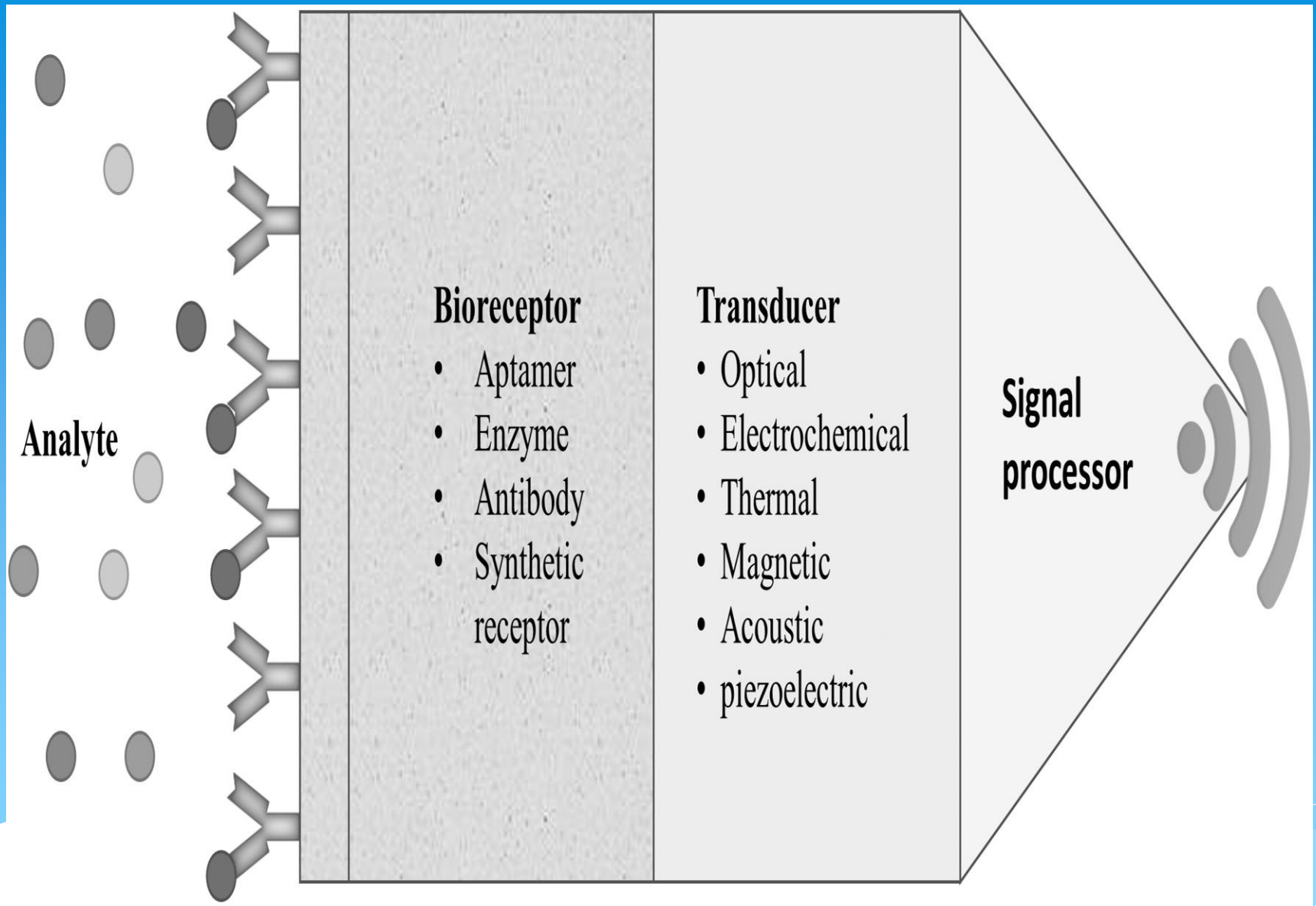
A sensor that integrates a biological element with a physiochemical transducer to produce an electronic signal proportional to a single analyte which is then conveyed to a detector.



Components of a Biosensor



Detector


Analyte
Bioreceptor
• Aptamer
• Enzyme
• Antibody
• Synthetic receptor
Transducer
• Optical
• Electrochemical
• Thermal
• Magnetic
• Acoustic
• piezoelectric
Signal processor

Components of a Biosensor

1- Analyta

2- Bioreceptor

- enzyme
- antibody

3- transducer

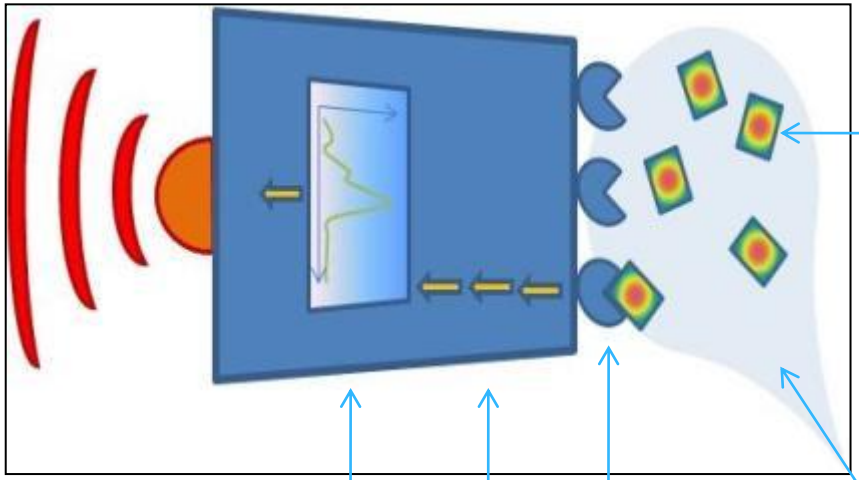
- Heat
- light

4- Electric signal

Father of the Biosensor

Professor Leland C Clark Jnr
1918–2005

Biosensor


Response
Analyte
Analysis
Signal
Detection
Sample handling/ preparation

Biosensor

1. The Analyte (What do you want to detect) Molecule - Protein, toxin, peptide, vitamin, sugar, metal ion

2. Sample handling (How to deliver the analyte to the sensitive region?)

(Micro) fluidics - Concentration increase/decrease), Filtration/selection

Biosensor

3. Detection/Recognition

(How do you specifically recognize the analyte?)

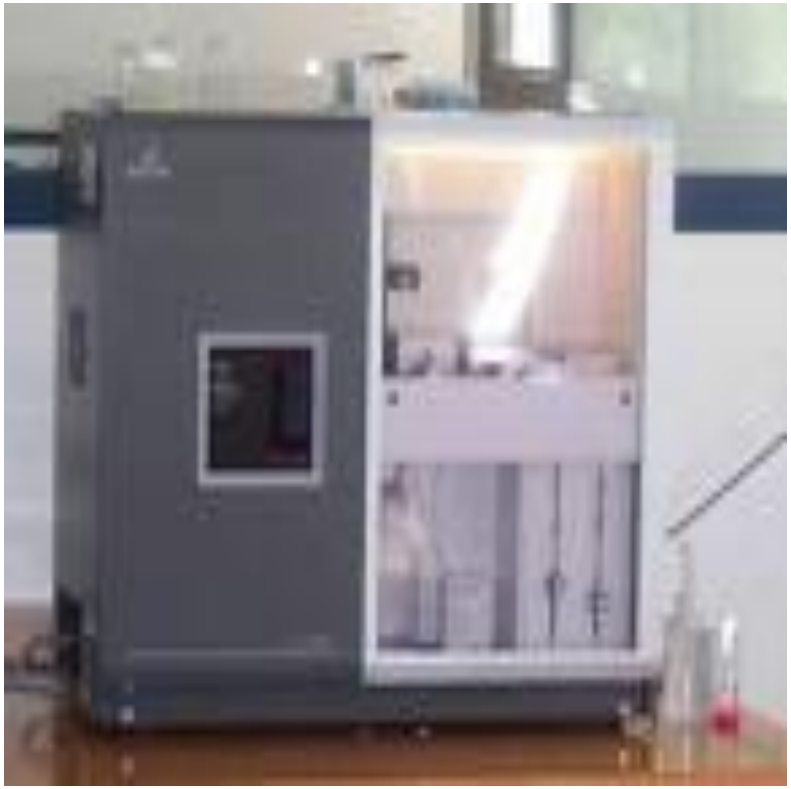
4. Signal

(How do you know there was a detection)

Example of biosensors

Infectous disease biosensor from RBS

Research Biosensors



Biacore Biosensor platform

Types of Biosensors

1. **Calorimetric Biosensor**
2. **Potentiometric Biosensor**
3. **Amperometric Biosensor**
4. **Optical Biosensor**
5. **Piezo-electric Biosensor**

DNA biosensor

the application to clinical diagnosis and genome mutation detection

- **Electrodes**
- **Chips**
- **Crystals**

Potential Applications

- Clinical diagnostics
- Food and agricultural processes
- Environmental (air, soil, and water) monitoring
- Detection of warfare agents.