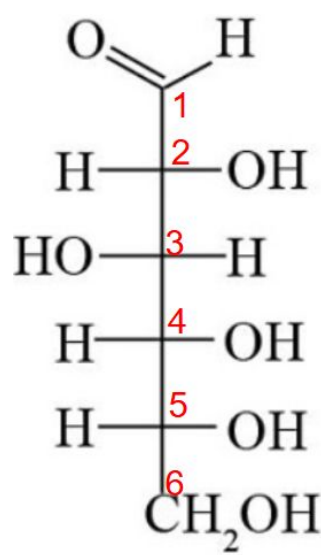
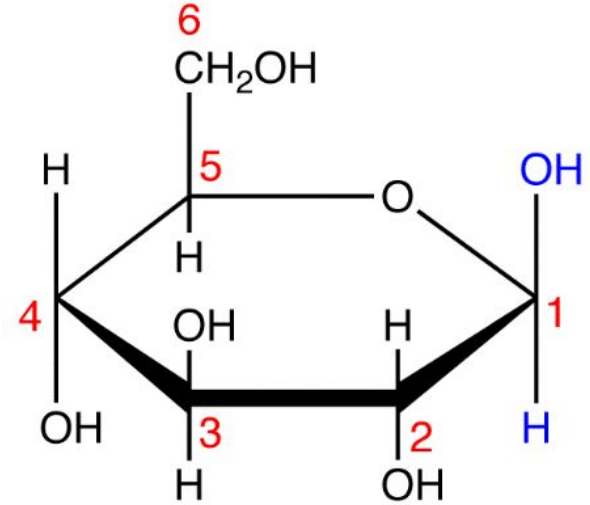


Carbohydrates

- Sugar
- Glycans
- Saccharides
- $(\text{CH}_2\text{O})_n$
- Prefix: glyco-
- Suffix: -ose



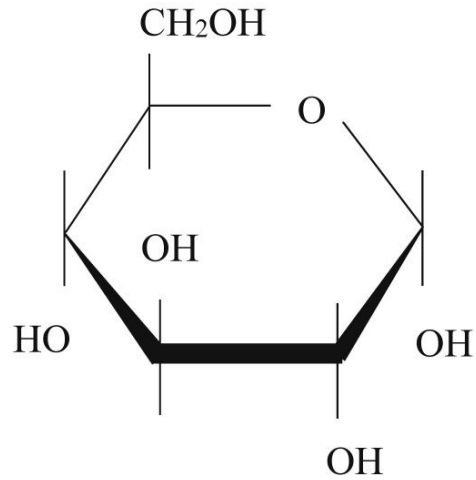
Fischer projection



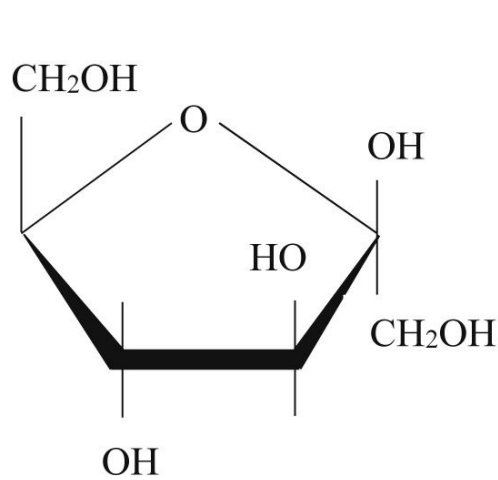
Haworth projection

beta-D-glucose

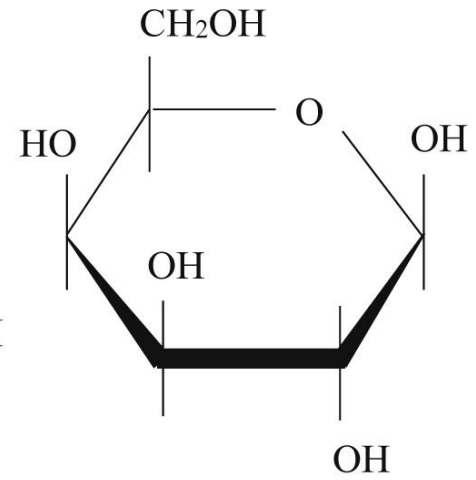
Pyranose (6) vs furanose (5)



Glucose

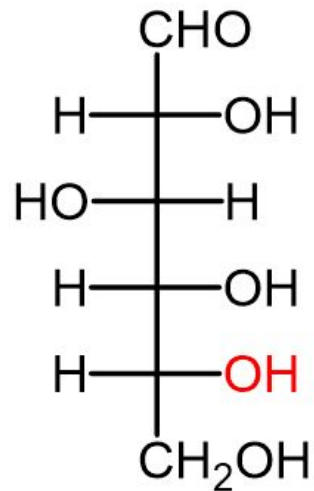


Fructose

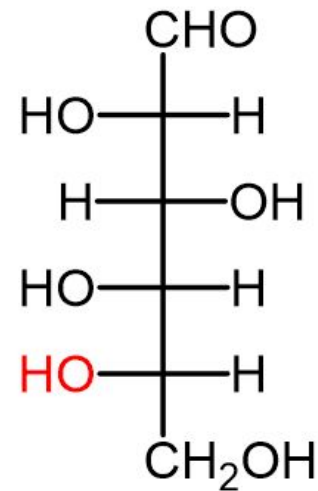


Galactose

Stereochemistry



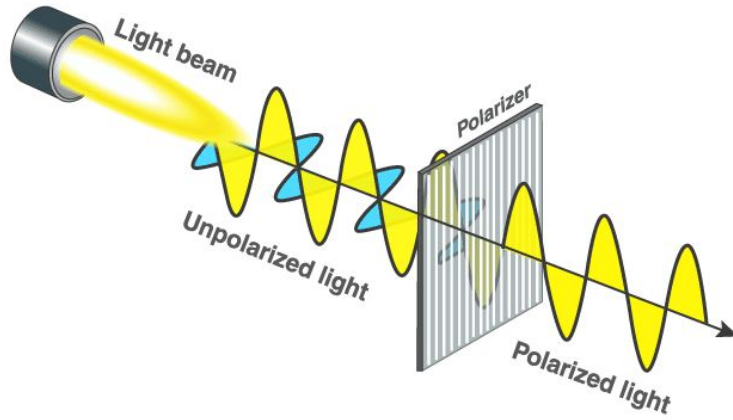
D-glucose



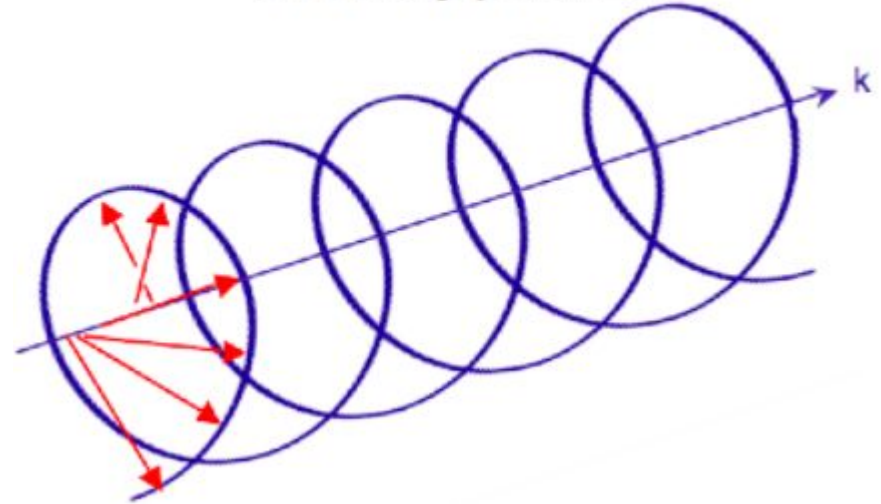
L-glucose

Enantiomers

D vs L sugars

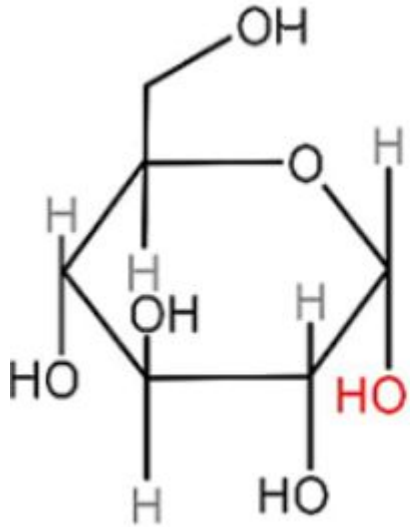


Circularly polarized

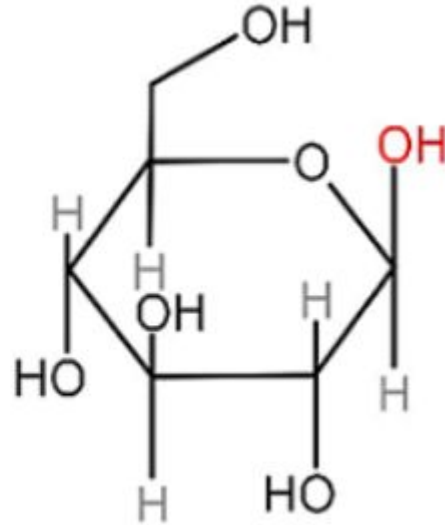


Circular dichroism

Alpha vs beta



alpha=opposite

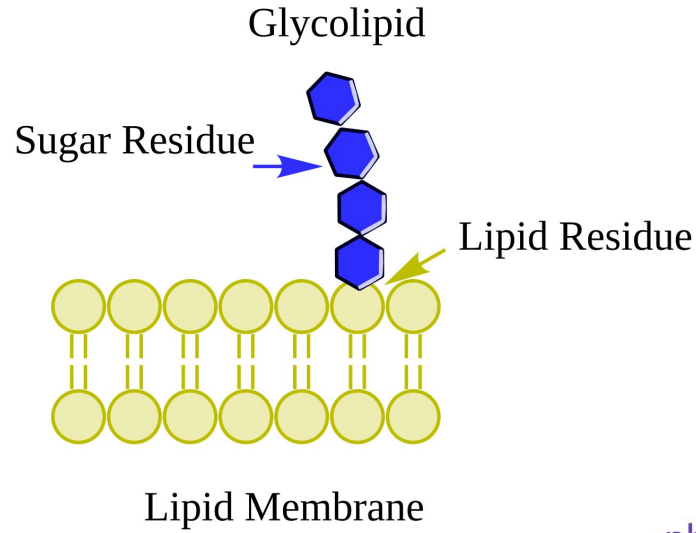
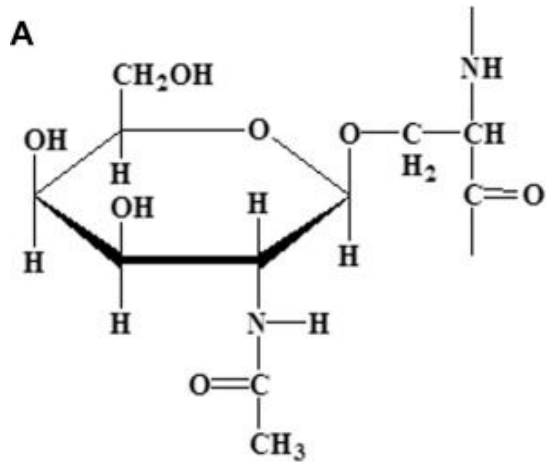


beta=same

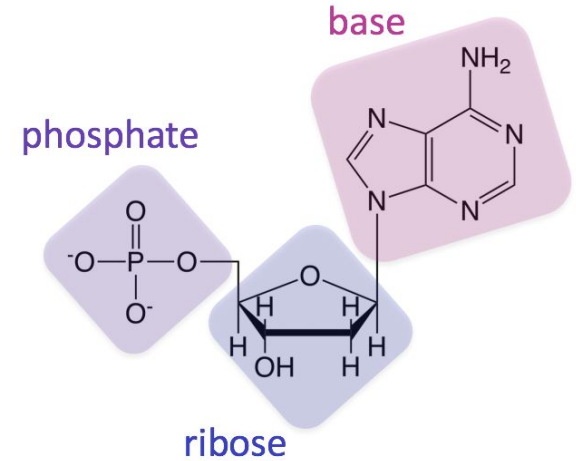
Anomeric carbon

Functionalization

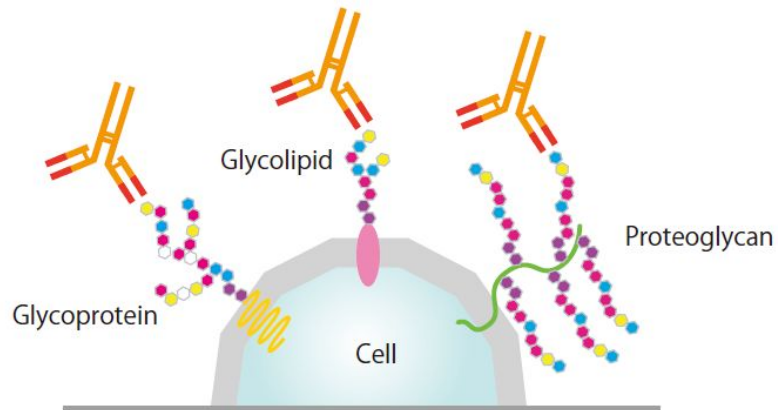
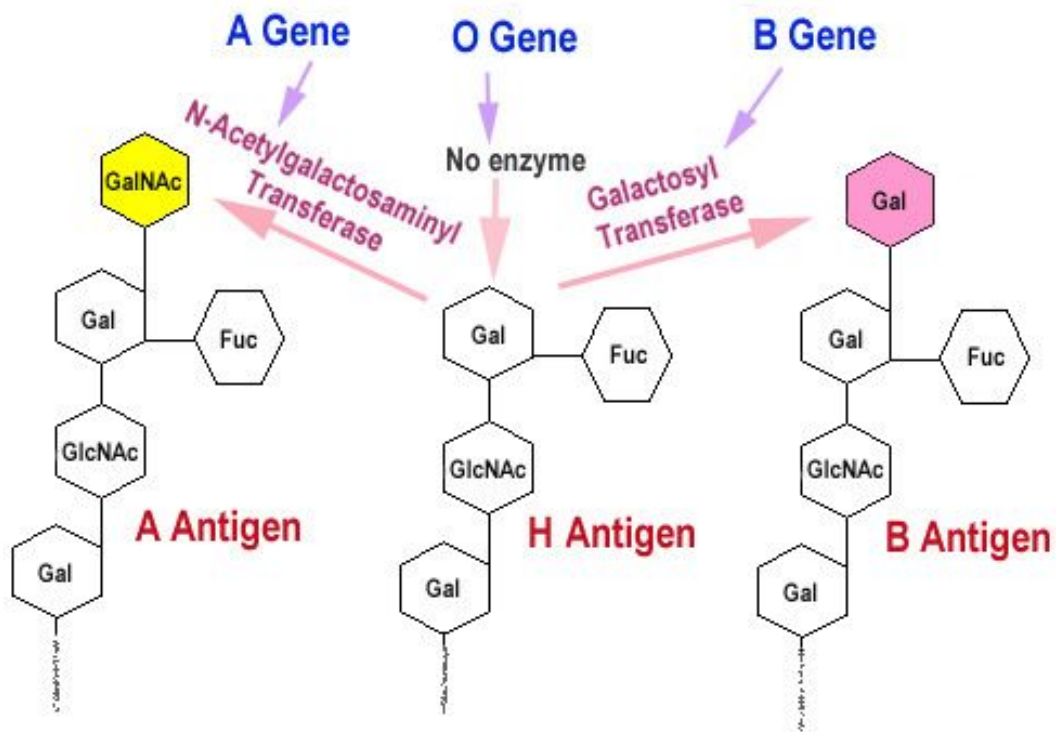
Glycoprotein



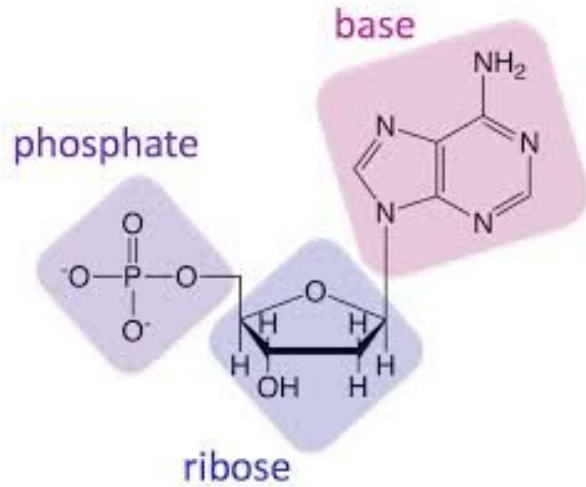
Nucleic acid



Specificity



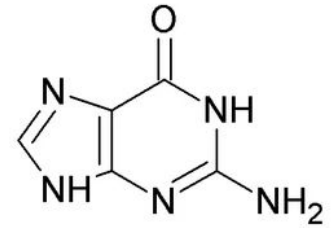
Nucleic acids



Purines

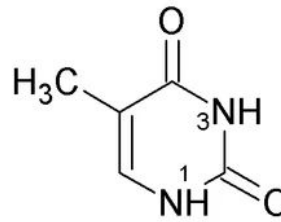


Adenine

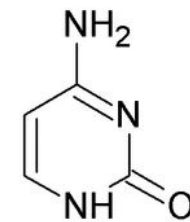


Guanine

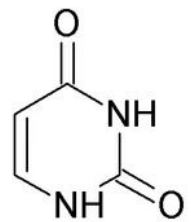
Pyrimidines



Thymine



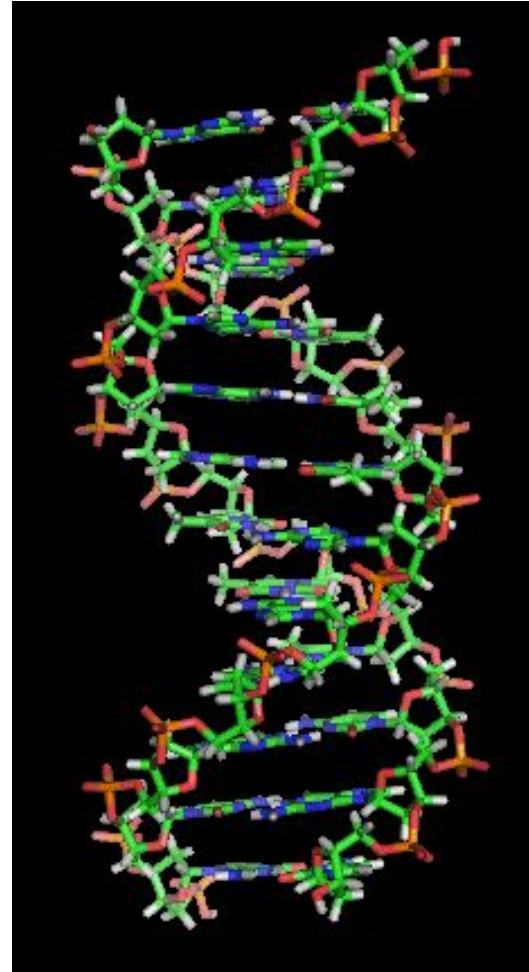
Cytosine



Uracil

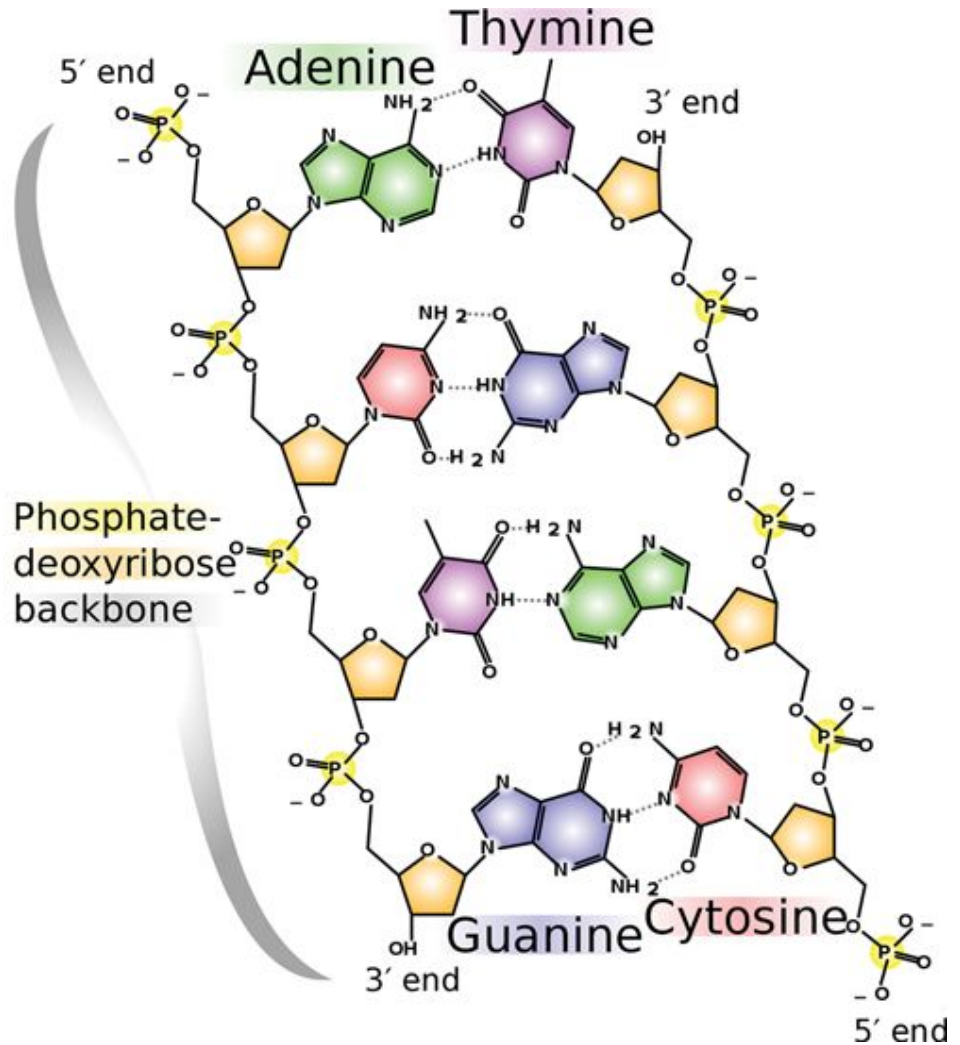
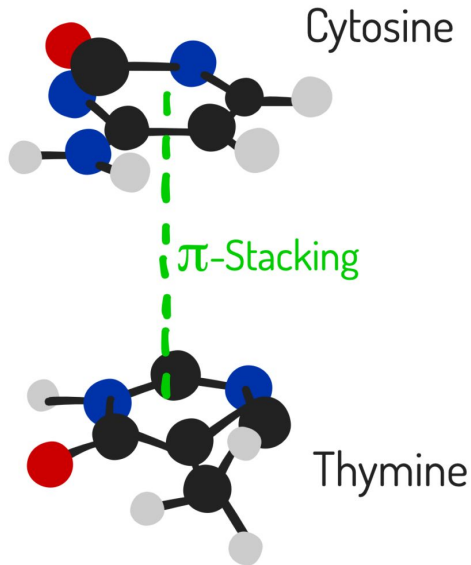
Structure

- Negatively charged sugar-phosphate backbone
- Base pairs make up “rungs of ladder”



Structure

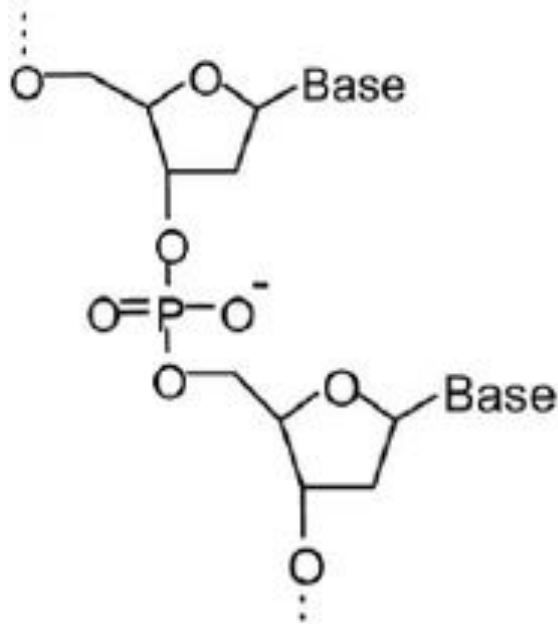
- Charge separation
- Hydrogen bonds
- Pi stacking



Modifications

Phosphate

- Oxygen to sulfur



Ribose

- Change sugar

Base

- Unnatural
- Deletion

General

- connectivity

Applications

- Immunotherapy
- Drug delivery
- Molecular sensing

