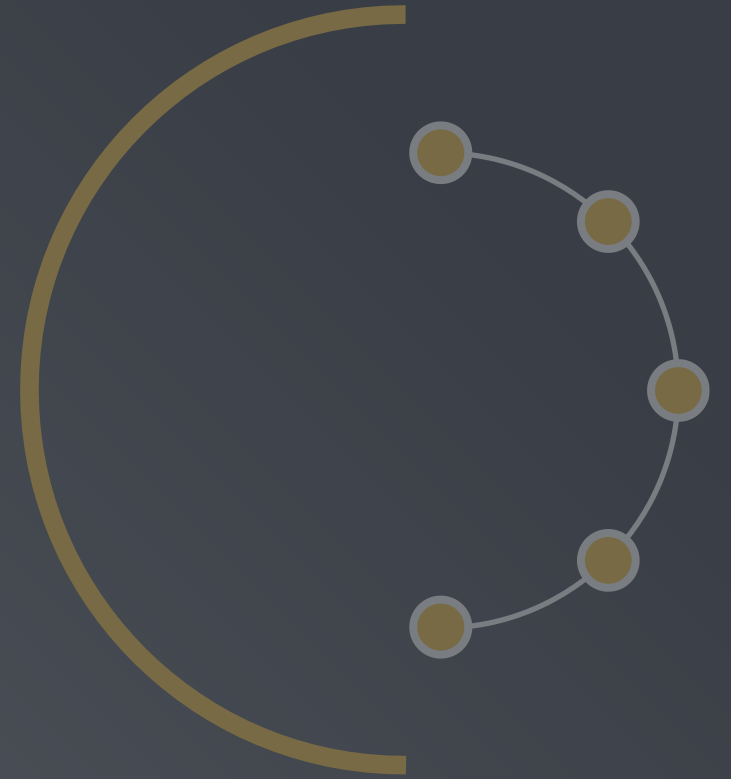




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Cyclodextrins as Gene Delivery Systems



Gene Delivery Systems

Viral Vectors

Adenovirus



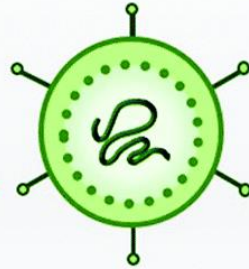
AAVV



Herpes Virus



Lentivirus

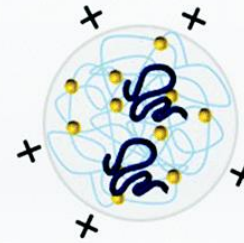


Non-viral Vectors

Cationic Lipid-based Particles



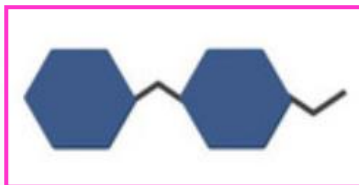
Cationic Polymers



Inorganic Nanomaterials



Non-viral Vectors



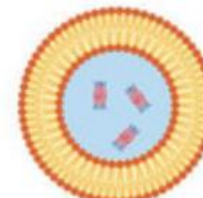
Natural Materials (Sugars)



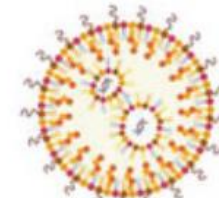
Polymeric nanoparticle



Dendrimers



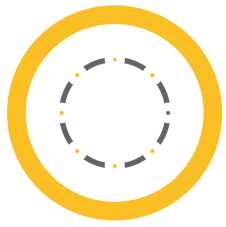
Liposome



Lipid nanoparticle (LPN)



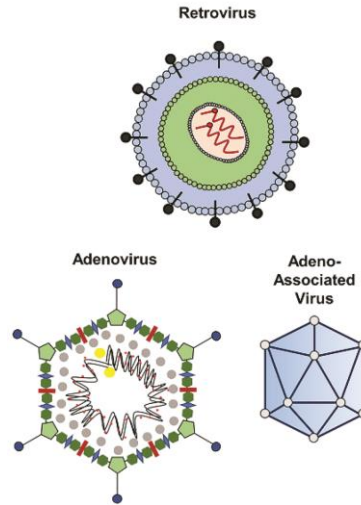
Silica nanoparticle



Overcoming Limitations

Viral vectors

- High immunogenicity
- Pre-existing immunity
- Limited cargo Capacity
- Safety concerns (viral replication, insertional mutagenesis)
- High cost
- Inhibited by some drugs (anti-coagulants)



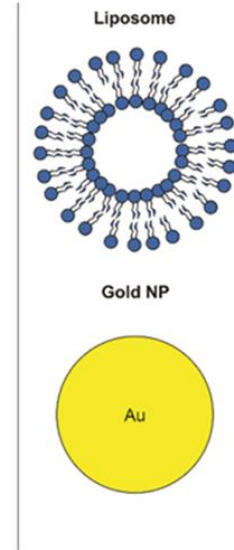
Non-viral vectors (*Pro*)

- Better biocompatibility
- Lower immunogenicity
- Lower risk of pre-existing immunity
- Large payload capacity
- Safer (no viral replication, no insertional mutagenesis)
- Greater versatility

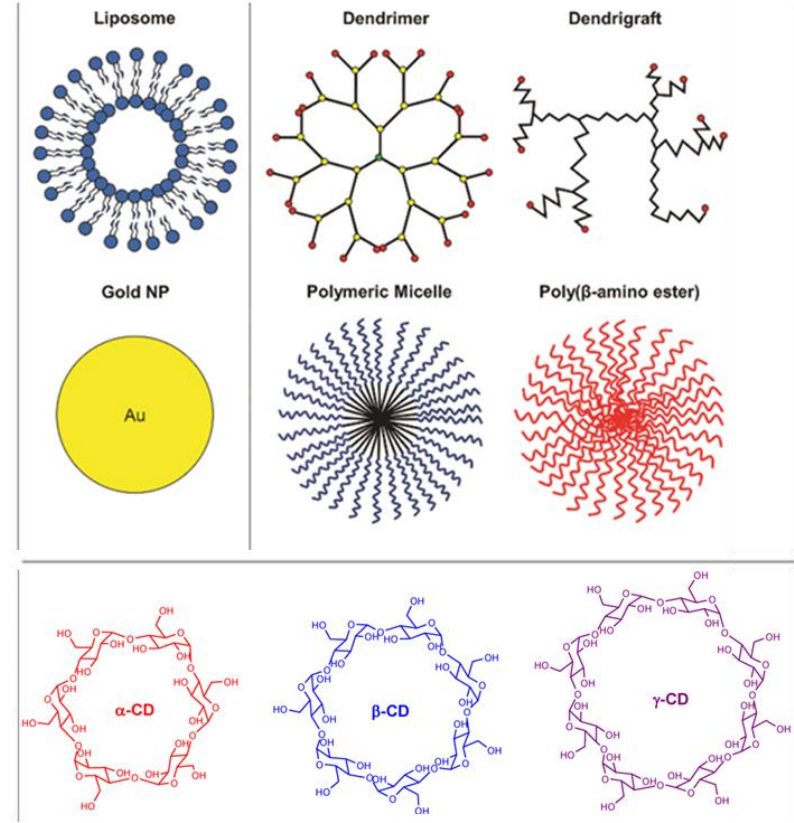
Non-viral vectors (*Contra*)

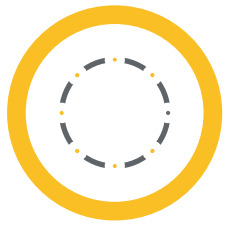
- Low transfection efficiency
- Still exhibit toxicity or immunogenicity
- Issues with reproducibility
- Shorter duration of gene expression
- Poor in-vivo stability

Non-Polymeric Vectors



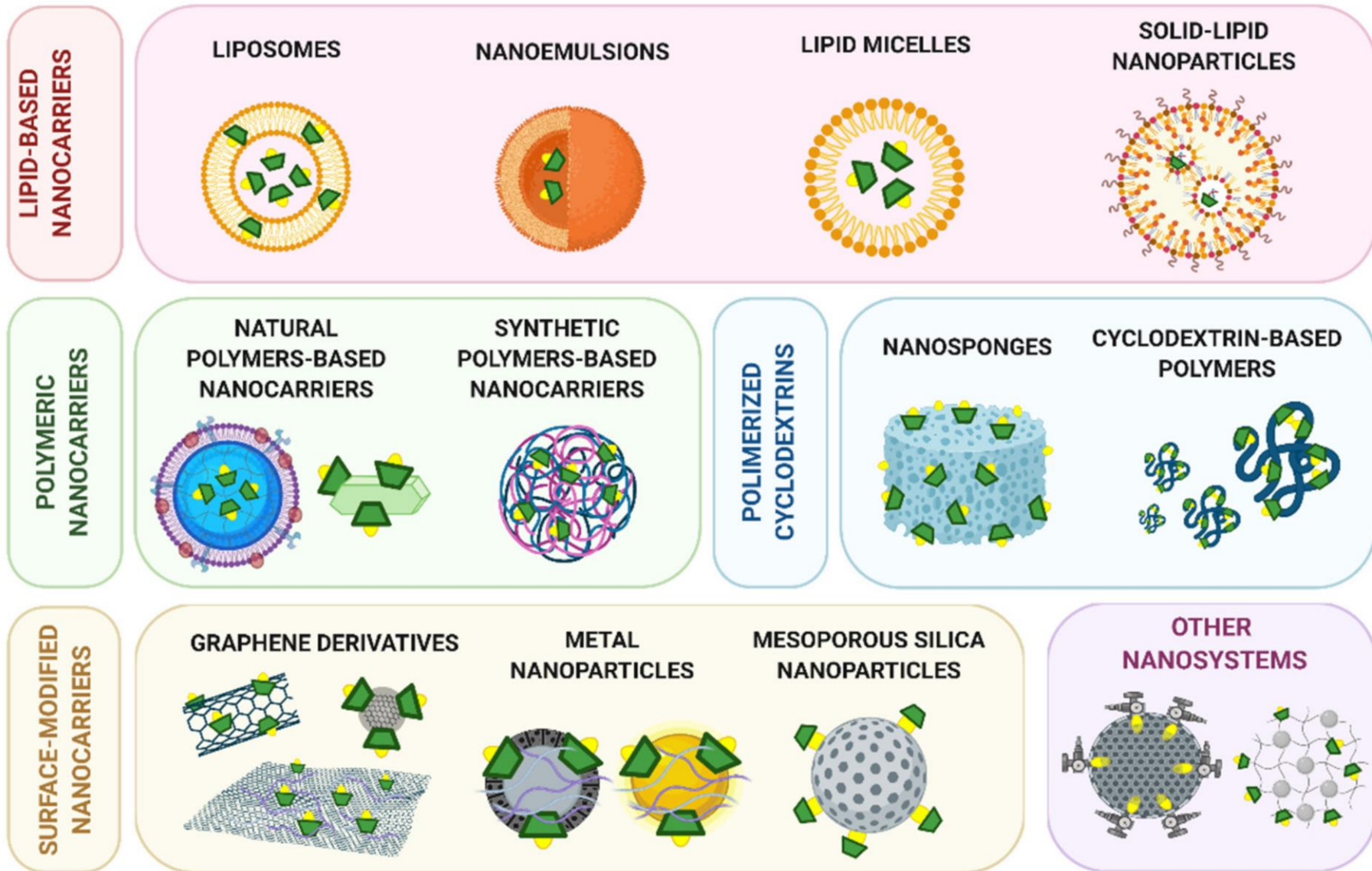
Polymeric Vectors

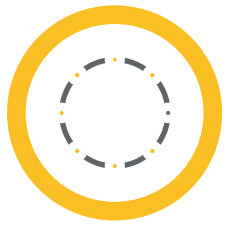




CD-modified Nanomaterials for Drug Delivery

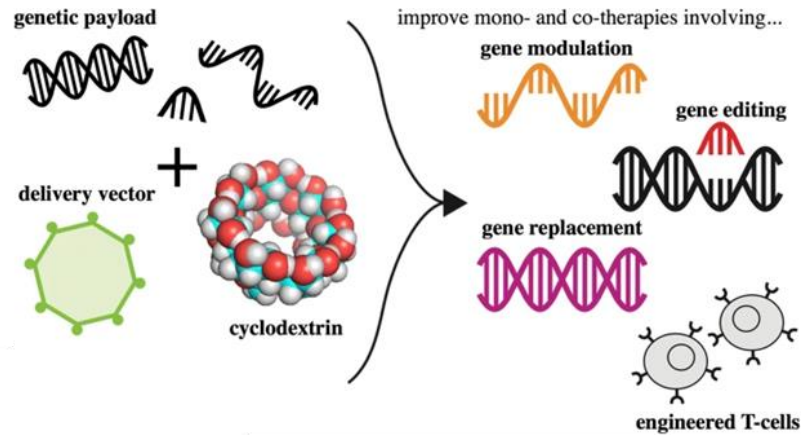
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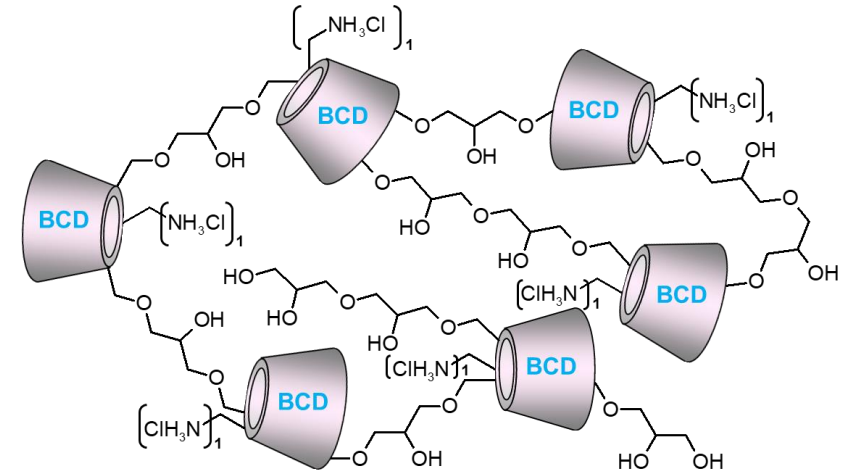


CDs in Gene Therapy Applications

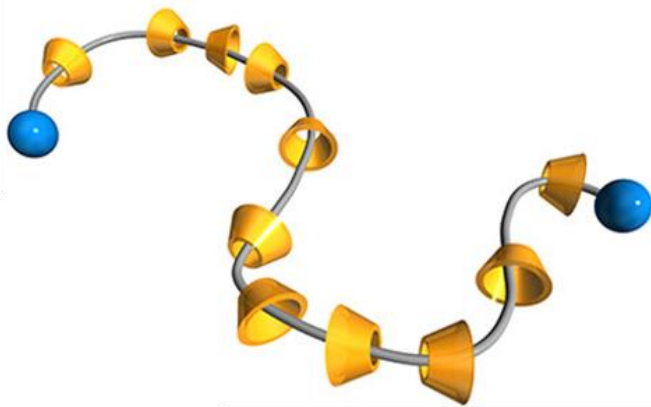
CDs as Formulation Enhancers



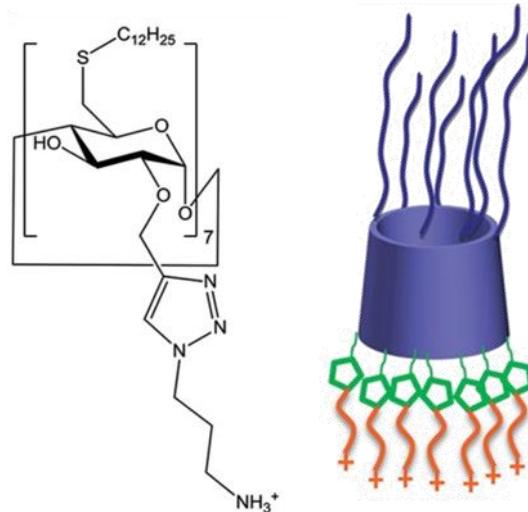
Cationic Polymers



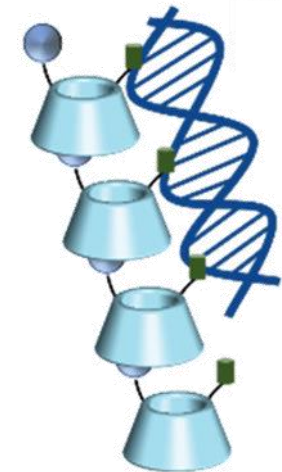
Polyrotaxanes



Pure CD vectors

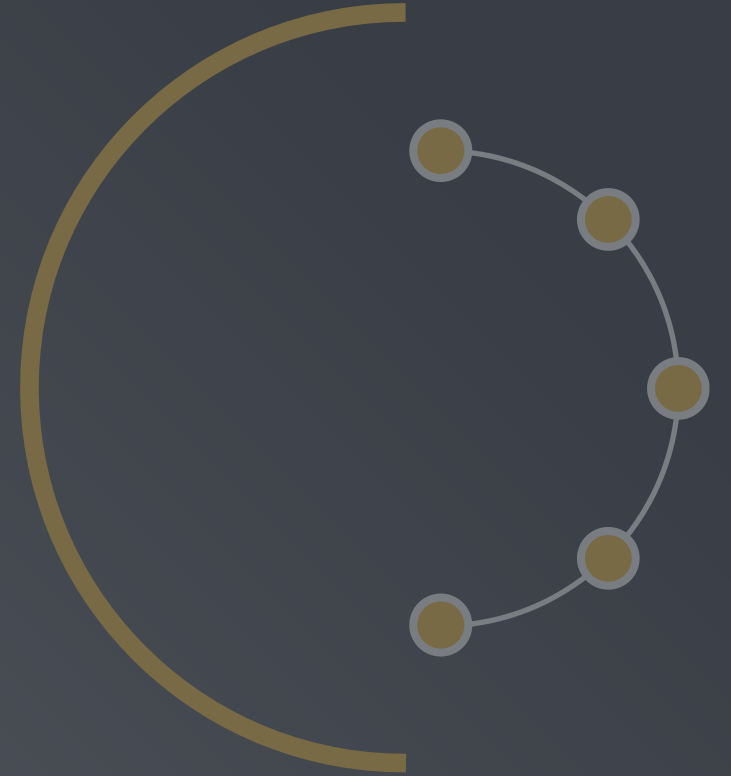


CD for supramolecular assembly





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For any questions:

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