

Extract of the keynote lecture

Implementation of water-soluble crosslinked cyclodextrin-based polymers for light-activated combination therapy

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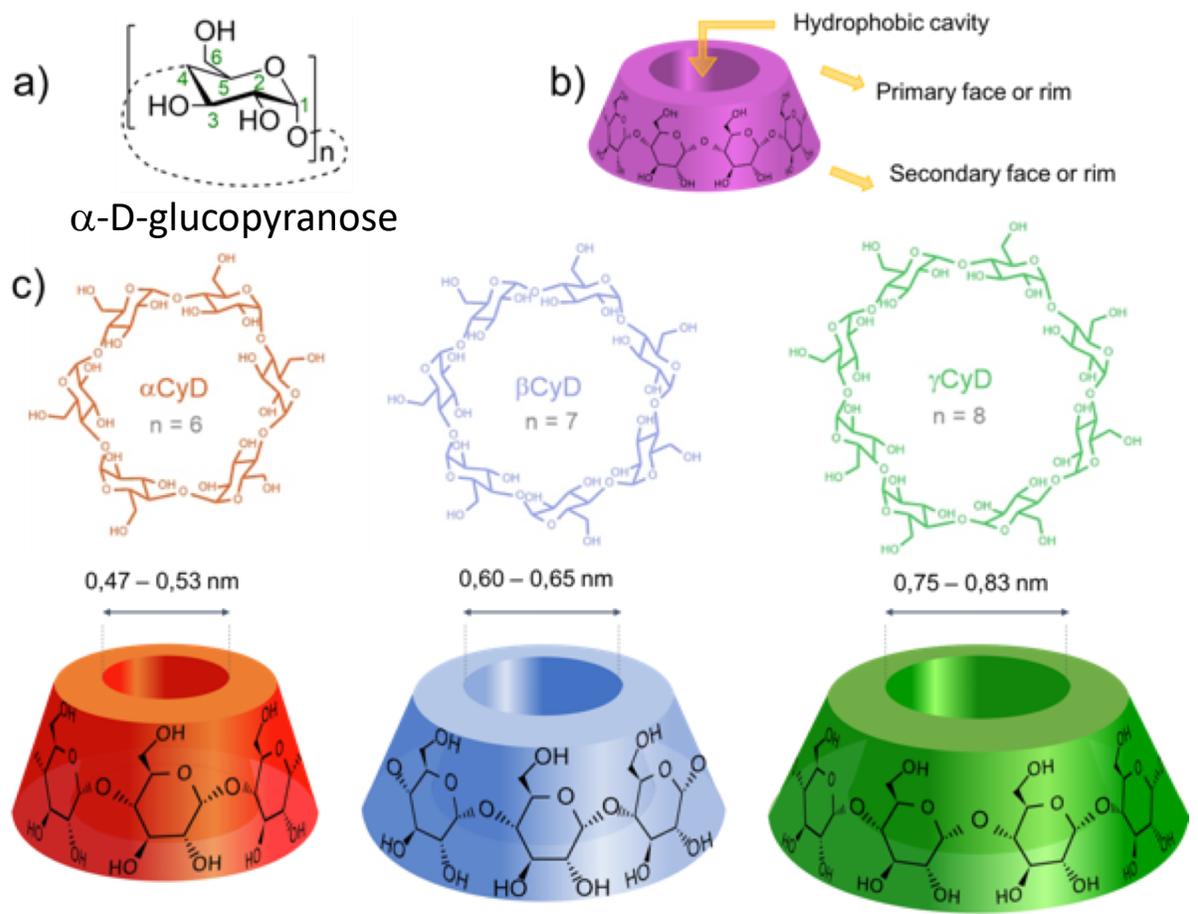
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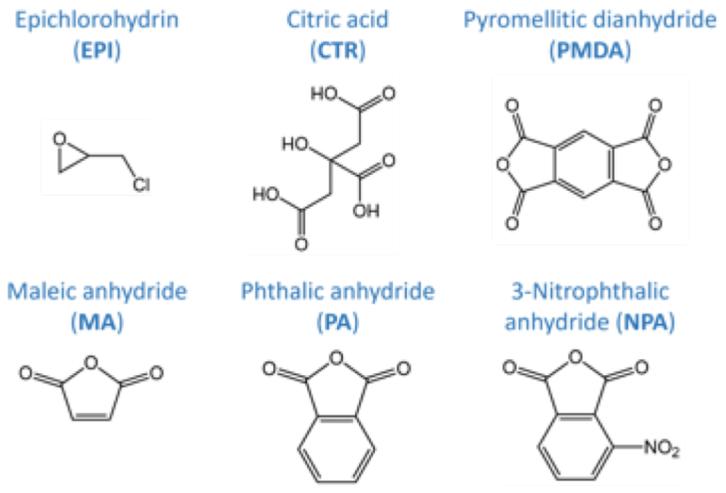
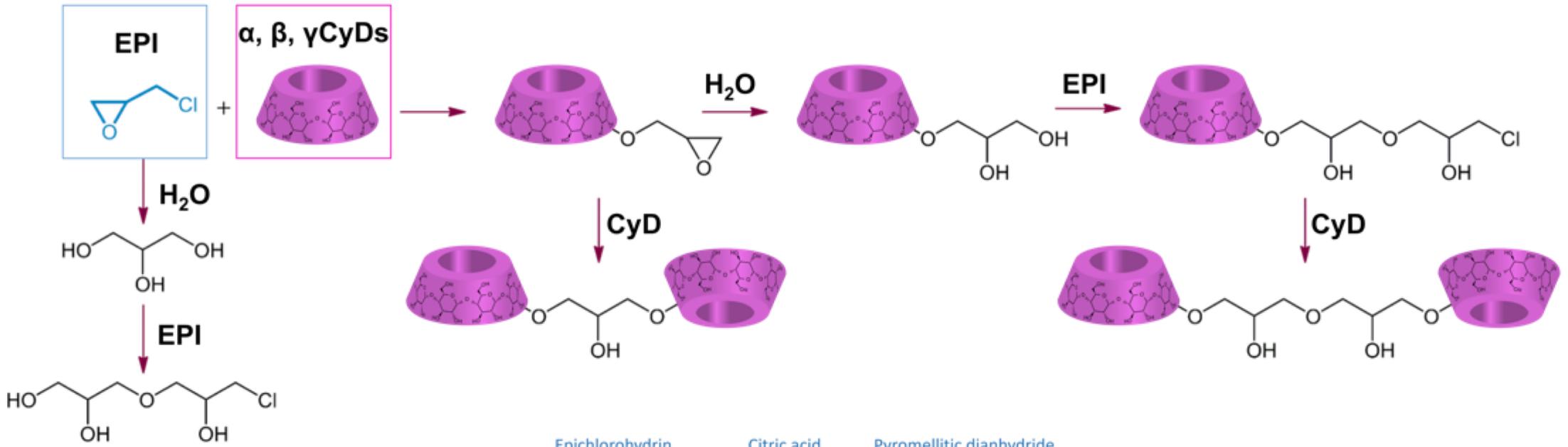
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Water-soluble crosslinked cyclodextrin (CyD) polymers: the natural building blocks



Water-soluble crosslinked cyclodextrin polymers: a green synthesis in water ready for upscaling!



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Water-soluble crosslinked CyD polymers: advantages

Monomer and polymeric CyDs

- **Bio**compatible and biodegradable oligosaccharides
- Hydrophobic cavity to host hydrophobic guest molecules assisted by **non-covalent** interactions such as hydrogen bonds and Van der Waals interactions
- Hydrophilic exterior surface enabling **water solubility**

CyD Polymer Exclusivity

- Solubility of the polymer in water up to 200 mg/ml corresponding to **0,1 M CyD** in solution compared to monomer solubility of 0,01 M;
- Polymer organizes in **nanoparticles** of few tens up to few hundreds of nm
- **Complexation sites** in the cavity and outside in the branched network
- **Combination therapy** loading multiple therapeutic agents



After 10 years

Work concluded:

- ❖ EPI-p β CyD polymer resulted to be the **best** performing polymer
- ❖ EPI-p β CyD is able to solubilize different types of **drugs** up to **30 mM** and likely even more increasing the polymer amount in solution
- ❖ EPI-p β CyD can encapsulate contemporarily drugs, NO donor and the photosensitizer **without compromising their performance**

Work in progress:

- ❖ Dark **toxicity** of the polymer alone with and without PS
- ❖ **Assessment of the efficacy** of the triple formulations compared to single polymer formulations on cells and in mice
- ❖ Investigate the **release of O₂** by ORA
- ❖ Encapsulation of the 3 components in **protonable and quaternary ammonium modified EPI-p β CyD** to select the best polymer



We gratefully acknowledge



<http://www.itn-cyclon.eu/>



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