Washington University in St. Louis
Office of Technology Management

NOVEL BENZO CROWN-ETHERS TO CREATE SYNTHETIC ION CHANNELS

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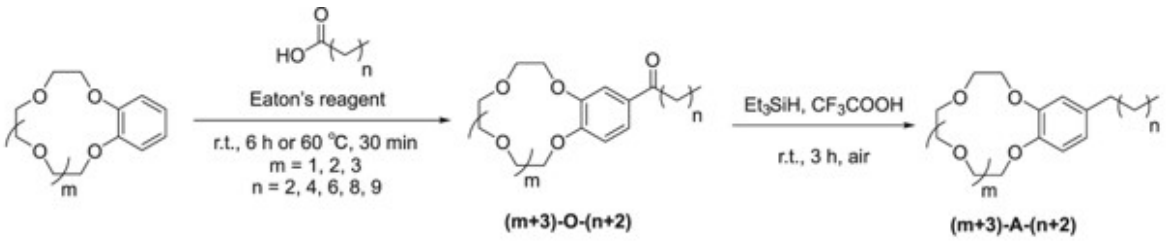
Technology Description

Researchers in Baron Chanda's lab at Washington University and Jennifer Schomaker's lab at University of Wisconsin-Madison have developed a library of benzo(crown-ether) compounds capable of self-assembly into ion channels. These monoacylated and monoalkylated benzo crown-ethers (MABCEs) do not cause membrane lysis at high concentrations, unlike other similar compounds. MABCEs are ideal for the production of synthetic ion channels in biological membranes.



Stage of Research

The researchers have produced 30 different monoacylated and monoalkylated benzo (crown-ether) compounds. Though some compounds were not soluble in standard reagents, the rest were tested in gram-positive bacteria to determine the kinetics of membrane depolarization. Translocation rates of K+, Na+, and NMDG+ cations were also determined.

Publications

- Carrasquel-Ursulaez W, Dehghany M, Jones CL, … Chanda B. (2022). Acylated and alkylated benzo(crown-ethers) form ion-dependent ion channels in biological membranes. *Biophysical Journal*, 121(6): 1105-1114.

Applications

- Synthetic ion channel production
- Bacterial growth inhibition

Key Advantages

- Non-toxic bacterial growth inhibitor
  - Causes membrane depolarization which increases the energy cost for maintaining cell viability and thereby inhibits bacterial growth. May be useful where the host cells are post-mitotic and pathogen is actively dividing.
- No membrane lysis at high concentrations, unlike earlier generations of ionophores
- Adjustable potency by changing alkyl chain length

Patents: Pending

Related Web Links: Chanda Profile & Lab