

Evolution of Mitochondria-Targeted Nanocarriers for Drug Delivery

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Abstract:

DQAsomes (dequalinium-based liposome-like vesicles) and Triphenylphosphonium cations bearing liposomes (TPP-liposomes), developed by my laboratory [1,2] are the prototype for all mitochondria-targeted vesicular pharmaceutical nanocarrier systems (Figure 1). First described in 1998 in a paper [1], DQAsomes have been successfully explored for the delivery of DNA and low-molecular weight molecules to mitochondria within living mammalian cells. Moreover, they also have triggered the design and development of a large variety of similar mitochondria-targeted nanocarriers. In my presentation I will describe the development of DQAsomes and TPP-liposomes as well as their application for mitochondrial gene therapy and mitochondria-targeted pro-apoptotic anticancer chemotherapy.

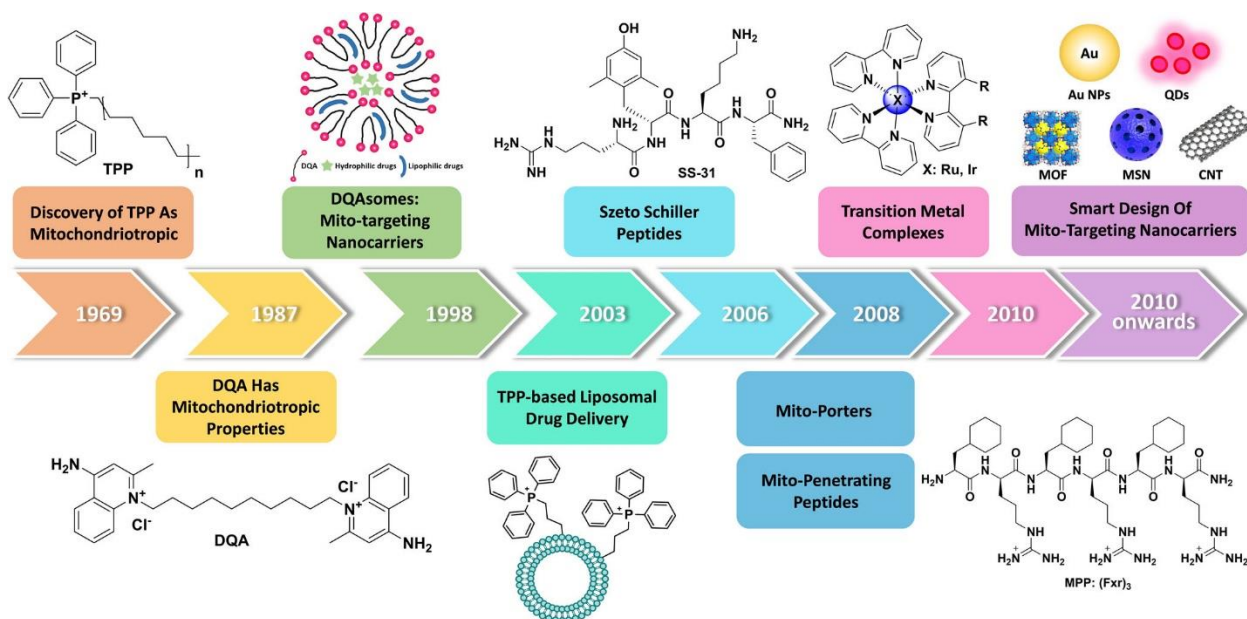


Figure 1: Discovery of mitochondriotropics and progress in the development of mitochondrial targeting nanocarriers over the years (From: Si Si Liew et al., *Angew. Chem. Int. Ed.* 2020, 59, 2-27)

References:

- [1] V. Weissig*, J. Lasch, G. Erdos, H. Meyer, T. C. Rowe and J. Hughes (1998). DQAsomes: A novel potential drug and gene delivery system made from dequalinium. *Pharmaceutical Research* 15, 334-337
- [2] S.V. Boddapati, P. Tongcharoensirikul, R.N. Hanson, G.G.M. D'Souza, V.P. Torchilin, V. Weissig* (2005) Mitochondriotropic Liposomes. *J Liposome Research* 15(1-2), 49-58