

COVER PICTURE

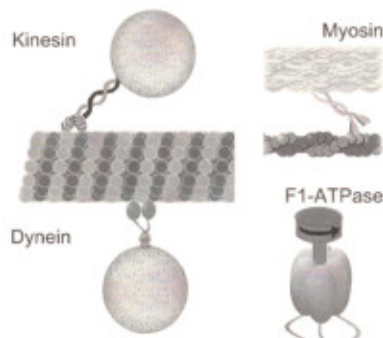
The cover picture shows representative plants of the Annonaceae plants (background), a family of tropical trees and shrubs that accommodates over 2300 species. More than 350 acetogenins have already been isolated from 37 species in this family, many of which have shown to be potent cytotoxic, antitumor, antimalarial, immunosuppressing, pesticidal, and antifeedant agents. It has been previously proposed that the cellular target of many Annonaceous acetogenins is the mitochondrial NADH-ubiquinone oxidoreductase (Complex I). The electron microscopic three-dimensional reconstructions of Complex I (lower right corner) from *N. crassa* (wire frame) and the homologous *E. coli* complex (surface rendered) show that the two complexes have similar structures. The cytoplasmic domain for *E. coli* is colored in gold and the membrane domain in blue. The surfaces of the membrane are shown schematically in red (T. Friedrich et al., *Biochim. Biophys. Acta* **1998**, 1365, 215). All acetogenins shown in the picture were previously synthesized by the Keinan-Sinha group. The asymmetric total synthesis of 34-acyloxy-34-tritio-asimicin (bottom) was achieved by means of a convergent synthetic strategy. This photoaffinity labeling agent is designed to identify the target protein subunit in Complex I. For more details see the article by E. Keinan, S. C. Sinha et al. on p. 2149 ff.



CONCEPTS

Contents

Nature's molecular machines! Biomolecular motors, in particular motor proteins, can introduce active movement into nanotechnology. As shown in the figure, the motor protein kinesin moves a vesicle along a microtubule, a process which is the cellular equivalent of high-speed transport. This inspires the assembly of nanoscale transport systems powered by biomolecular motors. The design of such hybrid "bio/nano"-devices requires suitable synthetic environments, and the identification of unique applications. We discuss recent proof-of-principle experiments, which demonstrate active transport and actuation on a molecular scale, and give an outlook to the future.



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Powering Nanodevices with Biomolecular Motors