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Central nervous system diseases treatment by nasal administration of drugs using a novel technology for direct delivery to brain

Treatment of Central nervous system (CNS) diseases could be improved by efficient delivery of the therapeutic agents to brain. Nasal drug administration is one promising strategy. However, direct delivery to brain with no need of a special device is a challenging task, many molecules being poorly absorbed through the nasal mucosa. The presentation will review work showing improved treatment by enhanced delivery to brain of drugs, tested in animal models for various diseases. Systems were designed by means of novel nanovesicular carriers for nasal administration of central acting drugs. Delivery to brain was tested by imaging technologies and quantification of drug levels in brain and plasma. Treatments and pharmacodynamic effects were evaluated in animal models for MS, pain, insomnia, Parkinson's disease and hot flushes. Results of several studies showed effective delivery of various drugs to brain and indicated the efficiency of the treatments. It presents near infrared images of the brain indicating superior accumulation of a model molecule in the organ, ten minutes following nanovesicular system nasal administration, relative to controls. An interesting finding is the statistically significant decrease of clinical scores and inflammatory cytokine expression in Experimental Autoimmune Encephalomyelitis (EAE) mice following the nasal administration of Glatiramer Acetate (GA) and Cannabidiol (CBD) combination. Moreover, neuron regeneration was observed in the hippocampus of this animal model. The enhanced delivery to brain and efficient pharmacodynamic effects achieved by administration of nasal nanovesicular systems could open a new way for non-invasive delivery to brain and improved treatment of CNS diseases.

Biography

Elka Touitou is an internationally recognized authority in the field of drug delivery and design of new carrier technologies for efficient nasal, transdermal and cannabinoid new products. She has pioneered leading technologies in the field that evolved into startup companies. Also she has been invited as a Visiting Professor at Universities in Europe and Asia. She has been the instructor of numerous graduate students. She has broad experience in collaborating with the pharmaceutical industry serving in their advisory board. She has more than 100 scientific publications including original research, reviews, book chapters and coeditor of two books. She is the inventor of international granted patents.

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