BioShuttle mediated transport of plasmides- a way to genetic interference

Two decades ago genetic interventions achieved exciting development of promising therapeutical approaches to treat genetic diseases like cancer. The choice of the appropriate gene transporter is the key for a safe and eficient gene transfer and a versatile transport system must be available. Great efforts in the development of carriers could lead to a broad sprectrum of delivery systems such as those based on viruses, polymeres or ultrasound waves. However the gene transfer was hampered by the limited efficiency and the poor entry of plasmid DNA from the cytoplasm into the nucleus of transfected cells and by the risk of nocious immunological response. The creation of a modular transporter system the BioShuttle seems to be a step to face these probems. The modules of the BioShuttle contain signal molecules to activate cell immanent transport systems and enablish to aim for specific subcellular compartments. After delivery into the cytoplasm the first module is cut off encymatically giving way to a nuclear localization adress sequence (NLS) which is equivalent to the natural substract in the cellular RAN-mediated importine system. The third module, the nuclease and protease-resistent Clamp-PNA (Peptide-Nucleic-Acid) harbours the complementary sequence to part of the ORI-localization in the plasmide being hybridizated before application.
Here we demontrate both the gentle BioShuttle- mediated transfer of the recombined plasmid phNIS-IRES-EGFP into HeLa cells by use of the Sodium Symporter system and the Iodide-125-uptake. The efficiency of the transcrption of EGFP was mesured by integration of fluorescence intensities using the Confocal Laser Scanning Microscopy.
In comparision to LipofectAmin treated probes it was also shown that the modular BioShuttle Carrier permits to realise a weaker but more evenly distributed gene expression and showed a smaller rate of mortality.
The use of the BioShuttle mediated Gene transfer could be a promising step to successfull therapy of genetic dysfunctions but there are still many steps in molecular and clinical research ahead.