

## LBL-Intra® - A Highly Efficient Carrier for Intracellular Delivery



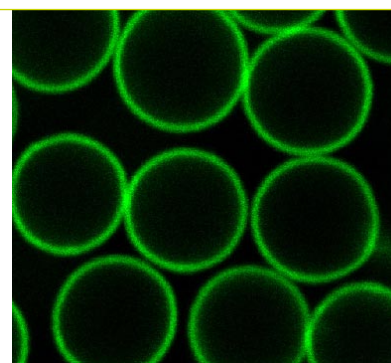
Intracellular drug delivery aims at transporting drugs or genetic material into living cells. Besides other applications, intracellular delivery techniques are used in gene therapy, where they are expected to fuel considerable progress in the treatment of cancer and hereditary diseases such as cystic fibrosis. Immunotherapy will also significantly benefit from advanced delivery methods to the cells. In the past, intracellular drug-delivery systems have been developed with limited success, often hampered by the cytotoxicity of the carrier systems. In other cases, the drug substances to be delivered remain unprotected within the carrier or are degraded upon entering the cell.

LBL-Intra® is a novel non-viral carrier manufactured according to the electrostatic principle of the LBL-Technology®. It applies the mechanisms of interaction with biological surfaces based on charge density phenomena. It especially increases the effectiveness of intracellular delivery of oligonucleotides.

### LBL-Intra® provides the following benefits:



- ENHANCED BIODISTRIBUTION
- REDUCED TOXICITY
- PROTECTION AGAINST ENZYMATIC DEGRADATION
- ENHANCED INTRACELLULAR UPTAKE
- PROTON SPONGE EFFECT FOR LYSOSOMAL ESCAPE
- EFFICIENT DRUG LOADING



LBL-Intra® is designed to present a prolonged circulation time, favouring the extent of its biodistribution. The clearance rate and toxicity issues related to unspecific binding to serum proteins and biological surfaces can be minimized by constructing carriers with inert outer layers and surface-active layers in the interior. The toxicity can be reduced by the careful selection of regulatory approved polyelectrolytes. In addition, complexes formed between polyelectrolyte substances present significantly lower toxicity compared to single polyelectrolytes. Protection against enzymatic attacks is achieved by the capsule wall itself. The enclosure of the drug within the LBL-Intra® carrier decreases the exposure of the active compound to a hostile environment. Enhanced intracellular uptake can be achieved due to the ideal carrier size of below 200 nm and a predefined distribution of the charged groups in the carrier. The proton sponge effect is expected in certain polyelectrolyte compositions, resulting in a successful escape from the lysosomal route. The effective loading of the drug in the carrier structure has been showed by rates of oligonucleotide complexation of up to 60%.

## LBL-Intra® can be used for:



- IN-VITRO APPLICATION IN CELL CULTURES FOR TRANSFECTION AND DOWN-REGULATION ASSAYS WITH MINIMAL TOXICITY COMPARED TO CONVENTIONAL VECTORS.
- IN-VIVO ADMINISTRATION OF GENE THERAPEUTICS WITH IMPROVED BIODISTRIBUTION AND REDUCED SIDE EFFECTS. IN IMMUNOTHERAPY, LBL-INTRA® SUPPOSES A NOVEL ADJUVANT STRATEGY FOR VACCINE FORMULATION.

## LBL-Intra® can be customized to particular development needs by providing a high flexibility in:



- MATERIALS
- BIOCOMPATIBILITY
- PARTICLE SIZE
- DRUG LOADING

In addition, LBL-Intra® is manufactured in an aqueous medium (RT, 5 < pH < 7.5) under very mild conditions to preserve the drug integrity.

