

[PE1-18] [10/18/2002 (Fri) 13:30 – 16:30 / Hall C]

Transport of Organic Cations across Caco-2 Cell Monolayers

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Apical to basal transport of organic cations (OCs) such as tributylmethylammonium (TBuMA), triethylmethylammonium (TEMA), 1-methyl-4-phenylpyridinium (MPP), and berberine across Caco-2 cell monolayers was measured to elucidate the intestinal absorption of OCs. Basal to apical transport of MPP and berberine was larger than apical to basal transport and showed temperature dependency and concentration dependency, indicating that MPP and berberine are secreted into the intestinal lumen. Basal to apical transport of TBuMA and TEMA, however, was comparable to apical to basal transport, respectively. The apical to basal permeability of OCs across Caco-2 cell monolayers, which mimic the intestinal absorption, was berberine. From these results, we suggested that the accelerated secretion of TBuMA and berberine by ion-pair formation make the bioavailability of them smaller than TEMA and MPP.

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Effects of BuOH Extract of the Root of *Aralia elata* as an Absorption Enhancer on the Transport of Chondroitin Sulfate and Its Digestion Products *In Vitro* and *In Vivo*

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We investigated the absorption enhancing effect of BuOH extract of the root of *Aralia elata* (BERAE) in Caco-2 cell monolayers and rats. At the concentration of both 0.04% and 0.08% (w/v), BERAE decreased the transepithelial electrical resistance (TEER) values and increased the permeability of intact chondroitin sulfate (CS) and its digestion products as hydrophilic macromolecules in a dose dependent manner. We also evaluated the cytotoxicity of BERAE for the determination of a proper concentration as an absorption enhancer. MTT assay and trypan blue exclusion test indicated that the cytotoxicity of BERAE at the concentration below 0.1% (w/v) could be negligible. *In vivo* studies, CS was orally administered with or without BERAE to rats. Quantitative analysis of CS in rat plasma showed that the oral administration of BERAE (250 mg/kg) increased the intestinal absorption of CS, resulting in a 5-fold increase at 1h compared to the controls. A histological examination of the gastrointestinal tissue indicated that BERAE did not cause any tissue damage. In conclusion, our *in vitro* and *in vivo* results suggest that BERAE can be applied as an efficient absorption enhancer to make it easier for the hydrophilic molecules to permeate the intestinal epithelium.

[PE1-20] [10/18/2002 (Fri) 13:30 – 16:30 / Hall C]

Preparation and stability of N-terminal PEGylated Recombinant Human Epidermal Growth Factor

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To improve the stability of recombinant human epidermal growth factor (rhEGF) as therapeutic agent, the N-terminal PEGylated rhEGF (N-PEG-rhEGF) was prepared by site-specific bioconjugation and the stability was investigated in rat skin wound homogenates. Two different N-PEG-rhEGFs (N-PEG5K- and N-PEG20K-rhEGF) were successfully prepared with the yields of above 70%. The PEGylation site was directly confirmed by determining the molecular mass of Lys-C digested samples using MALDI-TOF MS. The biological activities of N-PEG5K-rhEGF and N-PEG20K-rhEGF were preserved 58.6% and 68.2%, respectively, compared to native rhEGF. The N-PEG-rhEGFs showed an improved stability over native rhEGF in rat skin wound homogenates. Of two N-PEG-rhEGFs, high molecular weight N-PEG20K-rhEGF was more stable. The degradation half-lives of native rhEGF, N-PEG5K-rhEGF, and N-PEG20K-rhEGFs were determined to be 0.95, 3.43, and 17.28 hours, respectively. This study indicates that PEGylation of rhEGF may increase the biological stability and has a greater potential for therapeutic use.

[PE1-21] [10/18/2002 (Fri) 13:30 - 16:30 / Hall C]

A Comparative study for single-shot immunization of diphtheria toxoid with combined PLGA microspheres.

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Biodegradable PLGA microspheres(MS) have been widely studied for delivering antigens because PLGA has the characteristics of various degradation rate. In general, since MS have shown potential for single-dose vaccines, the degradation rate of PLGA is determined by their molecular weight, polymer composition, etc. We studied the influences of molecular weight of PLGA, polymer composition and surfactant on in vitro release and in vivo effects. And a single-shot immunization of diphtheria toxoid (DT) with different MS preparation was compared to a conventional adjuvant preparation with alum. Various MS were prepared by W/O/W emulsification and solvent extraction method. MS were evaluated by particle size, surface morphology, loading efficiency, cloud point, bulk density, release test and immunization study. As decreasing the molecular weight of PLGA and using hydrophilic polymer, degradation rate increases. Amount of released antigen from low molecular weight PLGA MS and stearic acid ?added MS showed pulsatile release profile. The release of DT from surfactant-added MS was greater than that of were more than control. On the other hand, in vivo immune response by a single-shot immunization of DT with combined microsphere was equivalent to or even greater than that of three consecutive doses of conventional alum-adjuvant formulation. As a conclusion, combinations of different a good candidate for PLGA MS may be the development of effective single-shot vaccine delivery system.

[PE1-22] [10/18/2002 (Fri) 13:30 - 16:30 / Hall C]

Transfersomes-mediated gene transfer into organs in mice by direct application on intact skin

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Transfersomes are highly deformable hydrophilic lipid vesicles that are able to penetrate the skin barrier so that they can be used to carry low- and high-molecular weight molecules into the body. Until recently, it has been reported that molecules such as insulin, interleukin-2 and several other large molecules have been transported into the body using Transfersomes as a delivery system. Here however, for the very first time, genes (GFP) have been transported into the mice non-invasively using the Transfersomes as a delivery vehicle. Transfersomes are easy to manufacture, non-toxic, stable at least for a few weeks and can also transport genes therefore Transfersomes may be further developed in the future as a non-invasive gene delivery system and can be applied in gene therapy

[PE1-23] [10/18/2002 (Fri) 13:30 - 16:30 / Hall C]

Growth inhibition of human pancreatic cancer cells by CR2945-targeted liposome

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