Explanation of the Cover Photograph
Development of deliver system for genes and drugs using PEG-PLGA nano-spheres as a carrier material, prepared by Emulsion Solvent Diffusion (ESD) method

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The photograph shows a TEM image of biodegradable polymeric PEG-PLGA nano-spheres, PEGylated poly(lactic-co-glycolic acid), as siRNA carriers having approximately 35nm in average particle size measured by dynamic light scattering method.

The PEG-PLGA nano-spheres having core shell structure as shown in Figure, which could be used to prepare the stealth nano-particles or long-circulating nano-particles for the delivery of genes and drugs, was made by a novel physicochemical process using Emulsion Solvent Diffusion (ESD) method in the aqueous PVA solution with 1 to 5% siRNA, DAN plasmid, GFP plasmid, NFκB Decoy Oligonucleotides or other types of gene related materials loading depending upon the preparation conditions.

We succeeded encapsulating various gene related materials and drugs into the PEG-PLGA nano-spheres prepared by the ESD methods, which can fuse with cell membrane to efficiently introduce genes and drugs into cells. We newly discovered that this nano-spheres become very effective carrier for the delivery of gene related materials both in cytoplasm of cultured cells and in various tissues, which leads to new gene therapy development applied to the intractable human diseases.

The Beauty Science Laboratory of Hosokawa Powder Technology Research Institute has proposed variety types of biodegradable polymeric nano-spheres and devoted itself to the research and development of the advanced gene & drug delivery systems using several nano-spheres’ composite technologies.