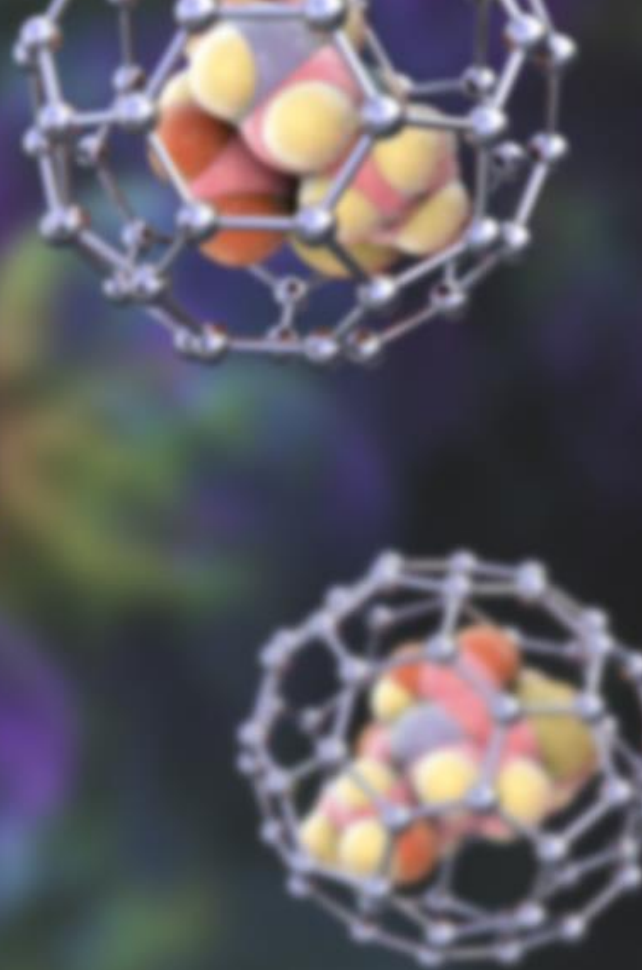
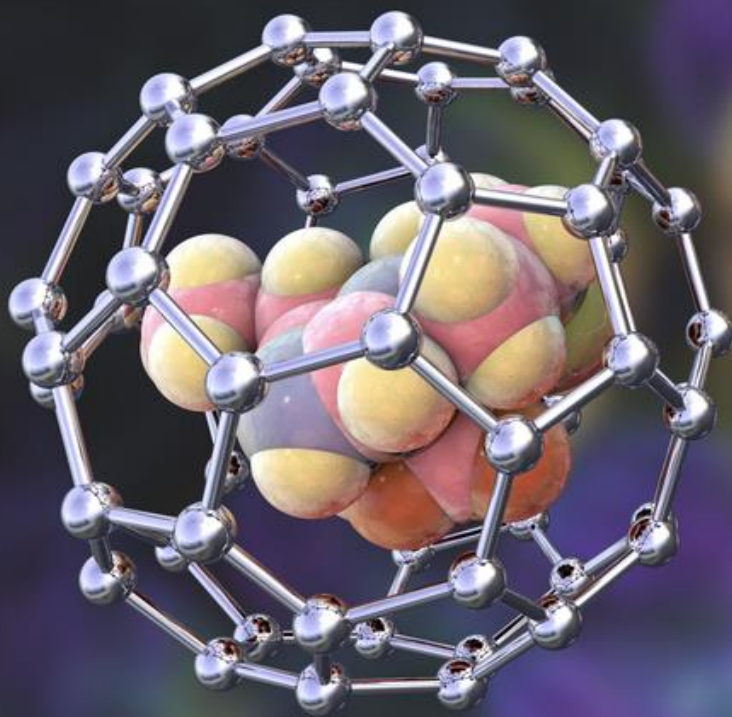




EVALUATION OF DISTRIBUTION OF PARTICLES CONSTITUTING THE DRUG DELIVERY SYSTEM (DDS) BY SIZE

Particle Size Distribution Measurement of Nano-Particle Products with NANOTRAC

Context

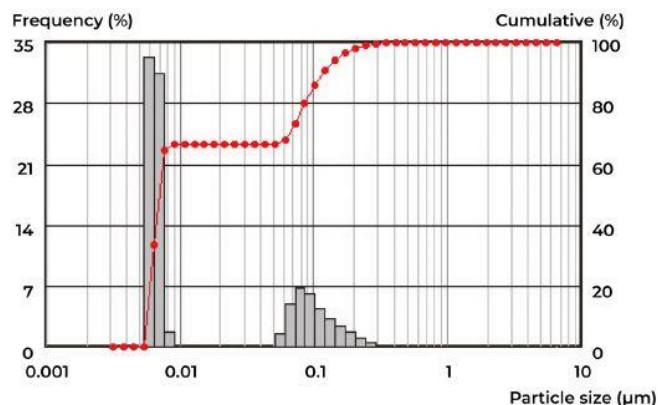
The Drug Delivery System (DDS) allows drugs to be delivered efficiently to the target site (affected site) while suppressing their adverse effects. If the size of the particles constituting the DDS is controlled, it is possible to allow the needed amount of a given drug to be absorbed via a specific site in a living body. "Ribosome" is a phospholipid capsule possessing an isolated inner aqueous layer in a double-structure lipid membrane identical to the membrane found in a living body. It is highly effective in suppressing adverse effects and is thus expected to be developed as an anti-cancer agent among others.

Also in the field of cosmetics, this kind of capsule has recently begun to be used in various products as it enables the functional ingredients of cosmetics to penetrate efficiently into the keratinous layer of the skin.

The following presents an example of an evaluation of distribution of particles constituting the DDS by size.

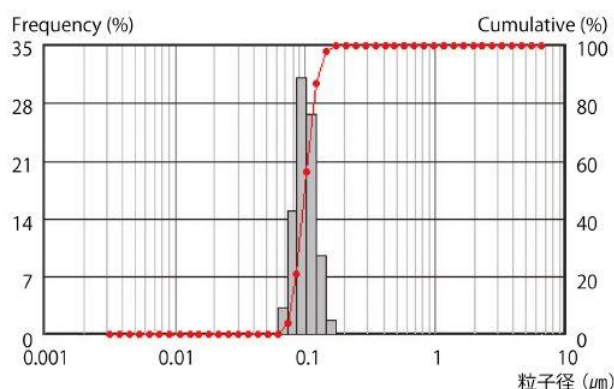
High-resolution measurement of nano-particle products

The use of a coherent optical reference allows, through optical wave interference, the conversion from optical frequencies to the difference between optical frequencies, the shift frequencies. For DLS the shift frequencies are on the scale of 1 Hz to 100KHz, readily detected by modest frequency electronics. Two methods of referencing are commonly used and are illustrated in Figure 1.



• Mixed molar ratio DSPE-PEG-micelle: ASC-DP= 2:1

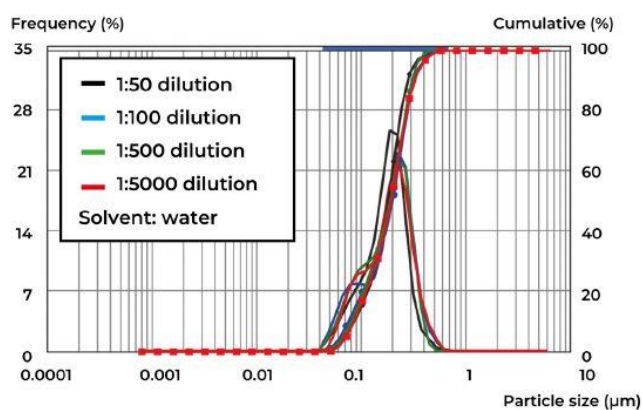
PEG Ribosome Measurement



Prepared by hydration & extrusion methods after combining HSPC / cholesterol (molar ratio 1:1) with DSPE PEG 5K (0.5 mol%)

Stable measuring results over a wide range of concentration

Commercially available ribosome (a vehicle for cosmetics)

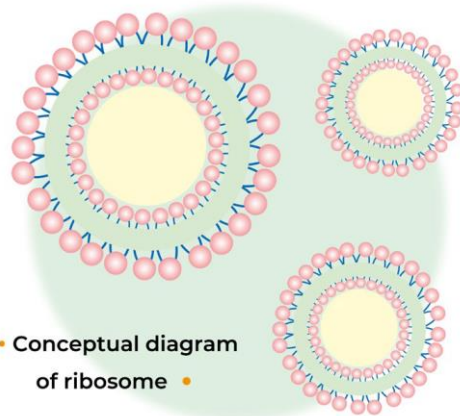


Apparatus used for evaluation

Instrument: Nanotracs (Particle Size Distribution Measurement System)

Principle of measurement: Dynamic light scattering (DLS) / Frequency analysis

Range of measurement: 0.8-6.500 nm



Conceptual diagram of ribosome

Source: Chiba University Graduate School of Pharmaceutical Sciences