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Interaction Between Nobiliside-A and Lipid Bilayers

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***SUMMARY*. Nobiliside A (Nob) is a new triterpenoid saponin first discovered and isolated from the *Holothuria nobilis* with chemical molecular structure of $C_{54}H_{87}O_{26}SNa$. Extracorporeal antitumor test showed that Nob may be a new category of effective anticancer medicine which had excellent cytotoxicity as well as inhibited vascular endothelial cell (VEC) proliferation and migration *in vitro* and chicken chorioallantoic membrane (CAM) angiogenesis in vivo at a lower dose. Unfortunately, the clinical application of Nob was severely limited by the low bioavailability of Nob after oral administration, and highly toxic especially heart toxicity and the ability causing hemolysis of blood cells after intravenous injection. To reduce the hemolysis and toxicity of Nob after intravenous injection, liposomes were used as its carriers and good effect was acquired in our previous study. During the preparation and study of Nob liposomes, we found that Nob liposomes had high encapsulation efficiency (EE), which nearly 100 % and good stability. It was proposed that there would be strong interaction between Nob and lipid bilayers, which would affect the EE, the stability, pharmacokinetics, pharmacodynamics and even the toxicity of the drug. Thus, fourier transformer infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), fluoroscense spectroscopy were used to study the interaction between Nob and lipid bilayers. The results showed that there was a strong interaction between Nob and both phospholipids (PL) and cholesterol (CH) in lipid bilayers, and the interaction between Nob and CH was stronger than that between Nob and PL. There was also interaction between PL and CH, which would be decreased when Nob existed. Thus, the reason of Nob liposomes having high EE and good stability could be infered from the study. In fluoroscense spectroscopy study it was found that Nob could destroy calcein liposomes and lead release of the content, while Nob encapsuled in liposomes could not cause the destruction of calcein liposomes. These phenomena were different with Nob liposomes leading to the content release from red blood cells, so the mechanism of Nob liposomes decreasing the toxicity to mice and hemolysis in vitro should be further studied.**

KEY WORDS: differential scanning calorimetry, fluoroscense spectroscopy measurement, fourier transformer infrared spectroscopy, interaction, liposome, nobiliside A.

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