Synopsis of Original Research Paper

Application of saccharide-encapsulated liposomes providing activities to promote cell survival for anti-aging cosmetics

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In this study, we examined the effect of maltose-encapsulated liposomes (ML) on cell survival of mouse fibroblast cell line L929 sub-clone (L929-S) in culture with glucose-deficient media. Under our experimental conditions, almost all of cells died within two days in culture without the addition of glucose, when cell viability was determined by trypan blue dye exclusion test. Even in the presence of 50 μg/ml glucose or empty liposomes, almost all of cells died within a similar range of time. Intriguingly, the combination of 50 μg/ml glucose and empty liposomes (G + L) prolonged the cell survival one day or so, suggesting that low concentration of glucose and liposomes synergistically act on cells to promote the survival. However, ML promoted the cell survival evidently more than G + L. In assays using WST-8, ML showed greater formazan formation in cells than the others including G + L. Therefore, the action mechanism of ML on the cell survival was considered to differ from that of G + L. To elucidate the mechanism of ML for promoting the cell survival, we examined by WST-8 assays whether ML separated by a dialysis membrane (ML/cup) could influence on the cell survival. ML/cup promoted the survival than maltose by the same treatment, suggesting that maltose consistently released from ML promoted the cell survival. However, the cell survival-promoting activity of ML/cup was apparently less than that of ML administered directly to cells, suggesting that ML acted on cells by not only the sustained release of maltose but also direct incorporation of liposomes into cells. Consequently, our results suggest that saccharide-encapsulated liposomes would be applicable for developing one of ingredients useful for cosmetics to activate skin cells whose metabolism lowered by such as aging.