

Cytotoxic Effect of Surfactants Used in Self-Microemulsifying Drug Delivery Systems (SMEDDS) on Normal and Cancer Gastrointestinal Cell Lines

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SUMMARY. Thirteen non-ionic surfactants frequently used in oral self-microemulsifying drug delivery systems (SMEDDS) were investigated for their cytotoxic effects on a normal GI cell (CRL-1790) and three cancer cell lines (AGS, Caco-2 and HT-29) using the MTT and neutral red assay. The toxic effect of the surfactants on the different cells lines decreased in the order: HT-29 > AGS > Caco-2 > CRL-1790 cells. The highest toxicity towards GI cells was observed when the cells were exposed to polyoxyethylene sorbitan fatty acid esters, polyoxyethylene castor oil derivatives and PEGylated glycerides, whereas the propylene glycol based derivatives, monomeric glycolic, polymeric glycolic and Plurol oleique showed moderate toxicity. The least cytotoxic activity was observed for Transcutol and Labrafac PG. The viability of the three cancer cell lines decreased significantly when exposed to mixtures of oil and surfactant containing increasing quantities of oil. Our results indicate that the cytotoxicity of SMEDDS is influenced by both the type and content of surfactant and oil components.

RESUMEN. Trece tensioactivos no iónicos utilizados con frecuencia en sistemas de administración de fármacos auto-microemulsionantes orales (SMEDDS) fueron investigados por sus efectos citotóxicos en una línea celular normal GI (CRL-1790) y tres líneas celulares cancerosas (AGS, Caco-2 y HT-29) usando el ensayo de MTT y rojo neutro. El efecto tóxico de los surfactantes en las diferentes células disminuyó en el orden: HT-29 > AGS > Caco-2 > CRL-1790. Se observó mayor toxicidad hacia las células GI cuando se expusieron las células a ésteres de polioxietilensorbitano de ácidos grasos, derivados de aceite de ricino de polioxietileno y glicéridos PEGilados, mientras que los derivados basados en propilenglicol, glicólico monomérico, glicólico polimérico y Plurol oleico mostraron toxicidad moderada. La menor actividad citotóxica se observó para Transcutol y Labrafac PG. La viabilidad de las tres líneas celulares cancerosas disminuyó significativamente cuando se expone a mezclas de aceite y surfactante que contienen cantidades crecientes de aceite. Nuestros resultados indican que la citotoxicidad de SMEDDS está influenciada por el tipo y el contenido de los componentes de surfactante y aceite.

KEY WORDS: surfactants, self-microemulsifying drug delivery system, toxicity, GI normal cells, GI cancer cells

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