

Methods and Compositions for Protecting Cells from Ultrasound-Mediated Cytolysis

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Technology description

Summary

Available for licensing and commercial development are methods for protecting cells from ultrasound-mediated cytolysis. The in vitro exposure of cells to ultrasound and the therapeutic uses of ultrasound (e.g., sonoporation, thrombolysis, HIFU, sonophoresis, acoustic hemostasis) may induce changes in tissue state, including apoptosis and cytolysis, through thermal effects (e.g., hyperthermia), mechanical effects (e.g., acoustic cavitation or through radiation force, acoustic streaming and other ultrasound induced forces), and chemical effects (via sonochemistry or by the activation of solutes by sonoluminescence). Ultrasound exposure conditions in these biomedical and in biological processes (e.g. ultrasound bioreactors) are limited by the need to increase the beneficial effects of ultrasound, while at the same time limiting the detrimental effects, such as apoptosis and cytolysis. Accordingly, the protecting molecules used to carry out the methods of the invention possess the ability to protect cells against ultrasound mediated cytolysis, without hindering ultrasound induced physical effects that could be utilized to create beneficial effects. The protecting solutes are surface active and possess at least one "carbohydrate unit" as described. The solutes include, but are not limited to: alkyl-beta-D-thioglucopyranoside, alkyl-beta-D-thiomaltopyranoside, alkyl-beta-D-galactopyranoside, alkyl-beta-D-thiogalactopyranoside, or alkyl-beta-D-maltotriose, hexyl-beta-D-glucopyranoside, heptyl-beta-D-glucopyranoside, octyl-beta-D-glucopyranoside, nonyl-beta-D-glucopyranoside, hexyl-beta-D-maltopyranoside, n-octyl-beta-D-maltopyranoside, n-octyl-beta-D-thioglucopyranoside, 2-propyl-1-pentyl-beta-D-maltopyranoside, methyl-6-O-(N-heptylcarbamoyl)-alpha-D-glucopyranoside, 3-cyclohexyl-1-propyl-beta-D-glucoside, 6-O-methyl-n-heptylcarboxyl-alpha-D-glucopyranoside.

Institution

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