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(54) **Title:** METHODS AND COMPOSITIONS FOR INDUCING APOPTOSIS BY STIMULATING ER STRESS

(57) **Abstract:** The present invention provides a method for inducing apoptosis in selected cells by aggravating ER-stress. The aggravation of ER-stress is achieved in a specific manner by inhibiting SERCA (sarcoplasmic/endoplasmic reticulum calcium ATPase), leading to elevated level of cytoplasmic calcium concentration, yet without inhibiting the activity of COX-2 (cyclooxygenase-2) or triggering the release of histamine. Induction of apoptosis may be enhanced by first inducing or further aggravating ER-stress through inhibition of proteasome or proteases. Also provided are compounds and compositions useful as ER-stress aggravating agents, methods for screening, selecting, identifying and designing the same and methods for treating diseased conditions by inducing apoptosis through specific and selective aggravation of ER-stress.