Technology: Methods for treating neural cell swelling

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Abstract: A composition comprising a novel Ca.sup.2+-activated, [ATP].sub.i-sensitive nonspecific cation (NC.sub.Ca-ATP) channel is described. The channel is found in mammalian neural cells and exhibits a different sensitivity to block by various adenine nucleotides, and is activated by submicromolar [Ca].sub.i. The NC.sub.Ca-ATP channel is activated under conditions of ATP depletion, which causes severe cell depolarization, followed by cell swelling. The NC.sub.Ca-ATP channel is regulated by a sulfonylurea receptor and is inhibited by sulfonylurea compounds glibenclamide and tolbutamide. Methods employing compositions comprising the NC.sub.Ca-ATP channel to screen for compounds that block the channel and the use of such antagonists as therapeutics in preventing brain swelling and damage are described. In addition, methods employing compositions comprising the Kir2.3 channel to screen for compounds that open the channel and the use of such antagonists as therapeutics in preventing brain swelling and damage are described.