UTP inhibits store-activated Ca^{2+} influx in HT29 cells

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In HT29 human colonic epithelial carcinoma cells, the activation of the M_3 muscarinic receptor by carbachol (CCh) leads to a Ca^{2+} response with a characteristic prolonged plateau phase due to Ca^{2+} influx following Ca^{2+} store activation. The activation of the $P2Y_2$ purinergic receptor by UTP, however, does not show this plateau phase. The lack of a plateau phase during $P2Y_2$ stimulation may result from the inhibition of Ca^{2+} influx. Hence, the aim of this study was to investigate whether UTP inhibited store-operated Ca^{2+} influx.

Fura-2 imaging techniques were used to monitor changes in intracellular Ca^{2+} concentration in HT29 cells.

We first used the rate of quenching of intracellular fura-2 by exogenous Mn^{2+} to estimate the activity of the store-operated Ca^{2+} channels. We found that the rate of Mn^{2+} influx during prolonged UTP stimulation was 34% lower than during prolonged CCh stimulation, consistent with UTP inhibiting the activity of the Ca^{2+} influx channels. We then estimated the activity of these channels by using the rate of increase of intracellular Ca^{2+} concentration during re-admission of extracellular Ca^{2+} to cells in which the intracellular Ca^{2+} stores had been depleted by exposure to thapsigargin in Ca^{2+}-free medium. We found that UTP reduced the rate of Ca^{2+} influx under these conditions by 45% compared to the rate of Ca^{2+} influx during re-admission of Ca^{2+} alone, and by 34% compared to the rate observed during the re-admission of Ca^{2+} in the presence of CCh. This also suggested that UTP inhibits store-operated Ca^{2+} influx.

We conclude that UTP inhibits store-activated Ca^{2+} influx channels.