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Studies on the Degranulation of RBL-2H3 Cells Induced by Traditional Chinese Medicine Injections

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ABSTRACT

Aims: To study RBL-2H3 cell degranulation phenomena induced by some TCMIs through cell morphological and ultra-structural observation, released enzyme activity and establish RBL-2H3 cell degranulation test indicated by *β*- hexosaminidase activity as a method to evaluate TCMIs at nonclinical stage. **Methods:** RBL-2H3 cells were used to study the degranulation by co-culture with positive control C48/80 and some TCMIs through morphological and ultra-structure observation, *β*-hexosaminidase activity detection. RBL-2H3 cell degranulation test was established to detect *β*-hexosaminidase activity caused by 17 kinds of TCMIs and their ingredients. The cytotoxicity effect of some TCMIs on both RBL 2H3 and BRL cells was measured by CCK-8 assay. **Results:** Toluidine blue staining and ultra-structure of electronic microscope observation of treated RBL-2H3 cells showed degranulation morphologically. Detection of *β*-hexosaminidase activity in the supernatant of treated cells showed some TCMIs had elevated enzyme release rates. Further analysis of the ingredients and compound in Tanreqing Injection and Shengmai Injection showed Scutellaria baicalensis Georgi in Tanreqing Injection, Red ginseng and Fructus Schisandrae Chinensis in Shengmai Injection were responsible to the degranulation of RBL-2H3 cells. Osmotic pressures and pH influenced RBL-2H3 degranulation. High Osmotic pressure of Tanreqing Injection and low pH of chlorogenic acid at 2.5 and 5.0 mmol/L congcentration might be responsible to high *β*-hexosaminidase activity. Most of the TCMIs inducing degranulation had cytotoxicity effect for both RBL-2H3 and BRL cells, but some TCMIs inducing degranulation had no cytotoxicity effect. **Conclusion:** Some TCMIs can induce degranulation of RBL-2H3 cells; RBL-2H3 cell degranulation test can be used in non-clinical stage to detect the risk causing anaphylactoid reactions. Osmotic pressures and pH influenced RBL-2H3 degranulation, and they should be measured before testing. The mechanism of degranulation caused by some TCMIs is cytotoxic, and some are non-cytotoxic and may be through exicytosis.

KEYWORDS

Traditional Chinese Medicine Injection (TCMI); RBL-2H3 Cells; Degranulation; β-Hexosaminidase; Anaphylactoid Reaction

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