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## Cytoprotective properties of plant-produced a sialo erythropoietin (asialo-rhuEPO)

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A sialo-rhuEPO, a non-hematopoietic recombinant human erythropoietin (EPO) derivative lacking sialic acid has been reported to display broad tissue-protective effects against damage triggered by ischemia/reperfusion, hypoxia or cytotoxic agents in the brain, the heart, the kidneys and the liver. However, attempts to translate its protective effects into clinical practice is hampered by unavailability of suitable expression system and its costly and limit production from expensive mammalian cell-made EPO (rhuEPO<sup>M</sup>) by enzymatic desialylation. It is known that plants can synthesize complex N-glycans similar to mammals but lack sialylating capacity. In our lab, we generated stable transgenic tobacco lines co-expressing human EPO and  $\beta$ 1,4-galactosyltransferase (GalT) genes to produce asialo-rhuEPO (asialo-rhuEPO<sup>P</sup>) lacking sialic acid but bearing mammalian-type  $\beta$ 1,4-galactose residues. We also developed an efficient purification system for isolating asialo-rhuEPO<sup>P</sup> from leaf tissues both at small scale (grams) and medium scale (kilograms). Purified asialo-rhuEPO<sup>P</sup> from transgenic tobacco leaves was found to have superior cytoprotective effect than rhuEPO<sup>M</sup> in protecting neuronal-like mouse neuroblastoma cells, murine HL-1 cardiomyocytes and pancreatic  $\beta$ -cells from staurosporine-induced cell death. These milestone studies have set the stage for the future investigations on its tissue-protective effects and action mechanisms in various animal models of tissue injury.

## **Biography**

Jiahua Jay Xie has completed his PhD in Biophysics at the age of 31 from Zhejiang University and Postdoctoral studies from Departments of Genetics and Horticultural Science, North Carolina State University. He served as a Senior Scientist at the Vector Research Inc. (a subsidiary of Vector Group Ltd) for five years. Currently, he is an Associate Professor in the Department of Pharmaceutical Sciences and the PI of the BRITE, NCCU. He has published more than 50 papers in reputed journals and has been serving as an Editorial Board Member of Journal of Zhejiang University (Agriculture and Life Sciences).

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