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## P2X7 Receptor mediates the activation and paracrine of microglia in radiation-induced brain injury

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Previous studies found that extracellular ATP could cause apoptosis via P2X7 receptor. We have known that activation of microglia plays an important role in the development of radiation-induced brain injury. P2X7 receptor, as a specific ion-selective purinergic receptor, was reported to participate in the paracrine and activation of microglia. However, it remains unclear whether ATP and P2X7 are involved in the pathophysiological alteration of radiation induced brain injury. In our study, we found that the patients' clinical severity of radiation-induced brain injury was correlated with the ATP concentration in their CSF. Also, higher ATP level indicated a larger edema and necrosis volume in MRI as well as higher LENT/SOMA scores, which suggested that ATP may be a possible indicator for radiation induced brain injury. In addition, we tested the inflammatory cytokines in the patients' CSF and we found that ATP was positive correlated with cytokines including Cox-2, TNF- $\alpha$  and IL-6. Furthermore, BV-2 cells and C57/BL6J mice were used to establish radiation-induced brain injury model. Microglia was activated after radiation and turned into an amoeba-like shape with bigger soma and thicker elongation of protrusion. The mRNA expressions and the protein expressions of P2X7, Cox-2, IL-6 and TNF- $\alpha$  significantly increased after radiation, via the PI3K/AKT and NF- $\kappa$ B signal pathway. After the P2X7 RNA interference or brilliant blue G(BBG, a specific P2X7 inhibitor) treatment, the mRNA expressions of P2X7, IL-6 and Cox-2 and the protein expressions of P2X7 and Cox-2 significantly decreased ( $P < 0.05$ ). Moreover, BBG promoted the proliferation of Brdu+ cells in the hippocampus of C57/BL6J mice. Our study demonstrated that P2X7 receptor plays a key role in the process of microglia activation after radiation.

### Biography

Yamei Tang has studied the mechanism and therapy for radiation-induced brain injury (RI) for more than 12 years, during which time she has published more than 30 papers articles in reputed peer-reviewed journals, including *Stroke*, the *Journal of Neurophysiology* and *Strahlentherapie und Onkologie*. An up-and-coming neurologist in China, she is a recipient of several awards for her contributions in the field of neuroscience, including the 2010 Travel Award to the Federation of European Neuroscience Societies Forum in Amsterdam. She has served on the editorial board for *Neurological Cases*. She also served on review committee for the National Natural Science Foundation of China (NSFC).

## Strategy for developing anticancer agents with peptides from marine source

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The biodiversity of the marine environment and the associated chemical diversity constitute a practically unlimited resource of new antitumor agents in the field of the development of marine bioactive substances. Many peptides from marine organism display potent anticancer activity; some of them have been developed clinically or entered into clinical trials. In this lecture, we hope to present the progress on the studies of antitumor peptides from marine sources. The biological properties and the mechanisms of different marine peptides are described; information about their molecular diversity is also presented. Novel peptides that induce apoptosis signal pathway, affect the tubulin-microtubule equilibrium, and inhibit angiogenesis etc are discussed in association with their pharmacological properties. Several novel marine anticancer peptides with unique targets, isolated from our laboratory are also presented.

### Biography

Xiukun Lin has been focused his research projects for more than 25 years on cancer-related aspects, including the discovery of novel anticancer agents, the mechanism of anticancer drugs, as well as regulation of cancer related genes; more than 100 peer-reviewed papers have been authored during his academic career. He is both the Associate President of the Committee of Anticancer Drugs and the Pharmacological Association of Anticancer Agents in China. He also serves as the Editorial Board of the journals: *Acta of Pharmacology, and Marine Drugs* in China.