



TETRODOTOXIN BINDING PROTEIN IN THE MARINE PUFFERFISHES

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Abstract

The aim of this study was to perform a literature review about the tetrodotoxin binding protein in the marine pufferfishes. The puffer fishes generally contain a potent neurotoxin, tetrodotoxin (TTX), responsible for many human intoxications. It acts by blocking the conduction of nerve impulses along nerve fibers and axons and the LD50 for the mouse is 10 nanograms. Tetrodotoxin, much larger than the sodium ion, acts like a cork in a bottle, preventing the flow of sodium until it slowly diffuses off. The distribution of TTX in pufferfish bodies appears to be species-specific. The toxin is thought to be bioaccumulation via the marine food based on the findings that cultured marine puffer fish are not toxic and non-toxic cultured puffer fish become toxic by feeding on artificial TTX-containing diets. TTX-bearing animals show extremely high resistance to TTX, and thus retain or accumulate *TTX* possibly as a biologic *defense* substance. It is curious how these TTX-bearing animals can accumulate toxin in their body without killing themselves. Therefore it is proposed that TTX is wrapped in a particular protein, and does not bind directly to the target side-sodium channel, and hence does not induce intoxication. The puffer fish TTX-binding protein (PSTBP) was first purified from the plasma of the marine puffer fish *Takifugu niphobles* as a possible TTX-carrier protein. PSTBP is a glycoprotein with the molecular weight 200 KDa and has an important role in the plasma protein binding of TTX in the Tetraodontidae family of marine puffer fishes.

Keywords: Pufferfishes, Tetrodotoxin (TTX), TTX-binding protein
