Autonomic neurotoxicity of jellyfish and marine animal venoms.

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Venoms and poisons of jellyfish and other marine animals can induce damage to the human nervous and circulatory systems. Clues to the pathogenesis and clinical manifestations of these lesions can be obtained from data of human envenomations and animal experimentation.

Because many investigators are unaware that marine animal venoms have autonomic actions, this paper aims to elucidate the broad antagonistic or toxic effects these compounds have on the autonomic nervous system.

Marine venoms can affect ion transport of particularly sodium and calcium, induce channels or pores in neural and muscular cellular membranes, alter intracellular membranes of organelles and release mediators of inflammation. The box jellyfish, particularly Chironex fleckeri, in the Indo-Pacific region, is the world's most venomous marine animal and is responsible for autonomic disorders in patients.

The symptoms induced by these venoms are vasospasm, cardiac irregularities, peripheral neuropathy, aphonia, ophthalmic abnormalities and parasympathetic dysautonomia.

Cases of Irukandji syndrome, caused by the jellyfish Carukia barnesi, have symptoms that mimic excessive catecholamine release. Coelenterate venoms can also target the myocardium, Purkinje fiber, A-V node or aortic ring. Actions on nerves, as well as skeletal, smooth or cardiac muscle occur. Recent studies indicate that the hepatic P-450 enzyme family may be injured by these compounds.

The multiplicity of these venom activities means that a thorough understanding of the sting pathogenesis will be essential in devising effective therapies.