

Cardiotoxicity of Jamesoni's mamba (*Dendroaspis jamesoni*) venom and its fractionated components in primary cultures of rat myocardial cells.

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Abstract:

Primary cultures of spontaneously beating myocardial cells isolated from neonatal rat hearts were used to screen the cardiotoxic effects of Jamesoni's mamba (*Dendroaspis jamesoni*) venom and components isolated from the venom by gel filtration and ion exchange chromatography. Cardiotoxicity was evaluated on the basis of leakage of lactate dehydrogenase (LDH), changes in morphology, cell membrane lysis, cellular viability, and alterations in spontaneous beating activity. The whole venom caused dose- and time-dependent leakage of LDH, disruption of the cell monolayer, decreases in viability, and inhibition of beating activity. Gel filtration of the venom yielded eight fractions (DjI to DjVIII). DjI (30 micrograms/ml), DjII (20 micrograms/ml), and DjV (20 micrograms/ml) caused significant (P less than 0.001) leakage of LDH, extensive morphologic damage, and decreases in viability. At lower concentrations DjI to DjVIII caused progressive inhibition of spontaneous beating activity. The main fraction (DjV), which was the most toxic, was further separated into 14 polypeptides (Dj1 to Dj14) by ion-exchange chromatography using Bio-Rex 70. Based on the ability to induce LDH leakage, produce morphologic damage, lyse cell membranes, and arrest beating activity, four categories of polypeptides were identified: cardiotoxins, Dj1 and Dj2; cardiotoxinlike polypeptides, Dj3 to Dj8; less active membrane lytic polypeptides, Dj9 to Dj13; and membrane lytic polypeptide, Dj14.