VASORELAXANT ACTIVITY OF CANAVALIA GRANDIFLORA SEED LECTIN: A STRUCTURAL ANALYSIS

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Lectins are comprised of a large family of proteins capable of the specific and reversible recognition of carbohydrates. Legume lectins, the most studied plant lectins, show high structural similarity, but with modifications that imply a variation in the intensity of some biological activities. The objectives of this work was correlate the primary and tertiary structure of the Canavalia grandiflora lectin (ConGF) with its vasorelaxant activity. The primary structure was determined by sequential mass spectrometry, the tridimensional structure was obtained through cristalography and the biological activity of vasorelaxation was tested by use of aortic rings. In this work, the primary and tertiary structures of Canavalia grandiflora lectin were determined. ConGF, a lectin isolated from C. grandiflora seeds, is able to induce relaxant activity in rat aortic rings. The complete sequence of ConGF comprises 237 aminoacids. This particular protein has primary sequence variations commonly found in lectins from Dioclea and Canavalia genera. The protein structure was solved at 2.3 Å resolution by X-ray crystallography. An X-Man molecule was modeled into the carbohydrate recognition domain. Still, ConGF (30 and 100 µg mL⁻¹) elicited 25% of vasorelaxation (IC₅₀ = 34.48 ± 5.07 µg mL⁻¹) in endothelialized aortic rings. A nonselective inhibitor of nitric oxide blocked ConGF relaxant effect, showing mediation by nitric oxide. Key distances between ConGF carbohydrate recognition domain residues were determined in order to explain this effect, in turn revealing some structural aspects that could differentiate lectins from the Canavalia genera with respect to different efficacy in vasorelaxant effect.

Keywords: Lectin, Vasorelaxation, Structure.

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