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Galectin-1 as potential target for diagnostics and therapeutics: Involvement in free radical-induced oxidative stress-mediated cardiovascular disorders

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Galectins are a family of animal lectins characterized by a consensus 134 amino acid carbohydrate recognition domain (CRD) and structures that specifically bind _-galactoside residues present in glycoprotein and glycolipid moieties of cellular bio membranes. The research works carried out in the last decade demonstrated Gal-1 involvement in the pathogenesis of various cardiovascular disorders. A soluble _-galactoside binding galectin was purified from buffalo (*Bubalus bubalis*) heart by Sephadex G50 gel filtration chromatography and extensive physicochemical characterization, structural analysis and protein chemistry of the purified buffalo heart galectin-1 (BfHG-1) was carried out. The startling revelation of the BfHG-1 being glycoprotein in nature and remarkable reduction in the activity profile of deglycosylated BfHG-1 under various physicochemical parameters strongly emphasized the vitality of glycosylation in maintaining the structural and functional integrity of BfHG-1. The susceptibility of carbohydrate binding activity of BfHG-1 to oxidative inactivation seems to be an important parameter for the measurement of the effect of oxidative assault on the galectin expression under various pathological conditions. Moreover, marked reduction in the activity of the oxidized galectin suggested its potential role in free radicalinduced oxidative stress-mediated cardiovascular disorders. The role of BfHG-1 and neutrophils activators (PMA and fMLP) in free radical production was therefore investigated. Under similar experimental conditions, oxidative burst (superoxide generation) of buffalo neutrophils was found to be approximately three times lesser than the degranulation (lysozyme release) of buffalo neutrophils. Thus it can be hypothesized that local Gal-1 concentration under physiological conditions might reach suitable levels for neutrophils stimulation and thereby act as a natural inducer of oxidative burst or degranulation. Hence, it can be concluded that Gal-1 induced free radical production may further enhance the existing oxidative stress *in vivo,* and the modulation of galectin signalling holds great promise for the diagnosis and therapeutics of various cardiovascular disorders as evident from preclinical studies.

Biography

Dr Ghulam M.D Ashraf has completed his Ph.D at the age of 26 years from Aligarh Muslim University. Presently he is working as Faculty in Amity Institute of Biotechnology (AIB), Amity University Uttar Pradesh (AUUP), Luck now, Uttar Pradesh, India. He has published 5 papers in reputed international journals and is working on a book with an international publishing house, LAP Lambert Academic Publishing, Germany.