Identification of the Potential Inhibitor for C.pneumonia Derived HSP60 from Medicinally Important Plants; A Therapeutic Approach for Reducing Inflammation in CAD

Soundhara Rajan G[1#], Ankita Sharma[1#], Sagarika Biswas[1]*

CSIR-Institute of Genomics & Integrative Biology, Mall Road, Delhi-110007

soundharar@gmail.com, anu.roula.kasganj@gmail.com, sagarika.biswas@igib.res.in

[#]authors contributed equally

ABSTRACT

Atherosclerosis, major contributor of Coronary Artery Disease (CAD), is a chronic inflammatory disease that occurs due to the accumulation of foam cells in the inner most layer of artery, eventually restricting the oxygenated blood flow to heart. The HSP 60 secreted by the *Chlamydia Pneumonia*, naturally found in the respiratory tract infections, tends to perpetuate or increase the inflammation. HSP 60 non-canonically interacts with the infiltrated neutrophils to increase the expression of inflammation mediators like ERK, IL-8 and TLR8.

Identification of inhibitory effect of anti-inflammatory compounds from medicinally valued plants may provide lead to the drug designing experiments, focusing HSP 60 as the therapeutic target. Five biologically active compounds from the different medicinal herbs were downloaded from the PUBCHEM database. The toxicity of the compounds on the cell and animal models has been analysed based on the 2D descriptors of the compounds. Docking of the ligands to the Protein has been performed through AutoDock standalone package. Initially ligand binding residues has been identified through blind docking. The binding of the ligands to HSP 60 and their binding affinities and the inhibitory constants were compared and statistically analysed. Rutin has been identified as biologically active compound with relatively high inhibitory constant that can be used as a lead compound for building Quantitative Structure Activity Relationship (QSAR) models. The ligand forms H-bond with Tyr197 and forms Vanderwaal's interaction with His76, Lys77, Glu78 and Gln122. The binding of ligand blocks the largest surface pocket reducing the catalytic efficiency. It also binds the antigenic epitope there by blocking the specific immune-modulatory effect.

Keywords: *Chlamydia Pneumonia*, HSP 60, Autodock, CAD, QSAR.