**ABSTRACT**

Hypertension or high blood pressure is attributed to a chronic health problem. Currently available therapies are indeed effective in combating hypertension, but not always devoid of complications. Hence, to pursue alternative anti-hypertensive therapies, the present study investigated human Cytochrome B5 Reductase 3 (CYB5R3) enzyme as a "contemporary" therapeutic target, since this enzyme regulates the bioavailability of nitric oxide, a vasodilator involved in governing vascular tone, and hence hypertension. In the present investigation, small-molecular weight inhibitors were virtually screened against the crystal structure of the enzyme to identify potential inhibitors as well as to obtain binding energies and inhibitory constants. The enzyme was purified to homogeneity from microsomal sources and the inhibitors were isolated using solid-phase adsorption techniques. The inhibition was measured using various biochemical techniques including fluorescence and CD spectroscopy so as to obtain binding affinity, number of binding sites, and effect on secondary structure, respectively. Fluorescence analysis revealed promising binding constants (in micro molar range) and stoichiometric ratios (1:1) for some of the inhibitors. CD analysis revealed that these inhibitors do not alter the secondary structure of the FAD containing enzyme. Further, the enzyme was crystallized using various biophysical techniques such as native and SDS-PAGE followed by X-ray crystallography. These encouraging findings have paved the way to investigate the enzyme further since overall, the identified and screened leads showed promising potential to be developed as novel anti-hypertensive drugs targeting CYB5R3.

**HISTOPATHOLOGICAL ANALYSIS**

Histological structural alterations were observed to demonstrate 2 stages of tissue.

1. **Fig. 18**: Tissue morphology presented as a side view of a section stained with hematoxylin-eosin. (DBT). Significant reduction in BP was observed in the UDSC 3 treated group.

**ACKNOWLEDGEMENT**

The authors are thankful to Department of Science and Technology (DST), New Delhi for providing necessary resources and facilities.

**PROGRAM NUMBER**: 1050.2

**AUTHOR AFFILIATIONS**

Gaurav Kumar*1, Sanjay Kamal Day1 and Suman Kundu*1

1Department of Biochemistry, University of Delhi, South Campus, New Delhi-110021

Email: gauravkumar.biochem@south.du.ac.in; suman.kundu@south.du.ac.in

*Correspondence author.