Aim & Scope
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In day to day life, the human body is exposed to several exogenous and endogenous reactive molecules. Some of the exogenous molecules like pharmaceutical drugs, if administered, are usually creating undesirable side effects. This could be due to the modification of drug metabolism or even if the drug has fair chance of getting metabolized completely it may have to compete with several other xenobiotics to which the organism is exposed simultaneously. Then this gives a wrong detoxication profile for the drug that is administered and it may be withdrawn from usage due to the simultaneous effect of other drugs. This situation arises because all the toxic reactive intermediates are competing for the drug metabolizing enzymes and their cofactors. Some times the xenobiotic may not be potential enough to induce the stress response or it may over exhaust the detoxication system. In both the cases the drug gives the detoxication profile as not recommendable. The induction of the drug metabolizing enzymes is dependent on xenobiotic potency, duration, route of administration, concentration etc.

The catabolic function of GSTs is to conjugate GSH with a variety of electrophilic substrates (Ketterer et al., 1994). The proteins of mu subfamily have similar catalytic specificities and mechanisms, are all cysteine rich and are found mainly in testis and share characteristics that distinguish them from other GSTs. From an evolutionary stand point these mu- class genes are the most divergent as explained in introduction.

Toxicity is a major concern for cancer/ anticancer drugs/ chemicals. The toxicants may have the properties of severity in toxicity, dose-limiting toxicity, acute versus chronic toxicity, cumulative toxicity and scheduled dependent toxicity. The recommended doses of drugs/ chemicals are determined according to the toxicity end point. Hematological toxicities represent the main toxicity of cytotoxic (Chatelut et al., 2003).
The human beings are supposed to take drugs in the form of tablets frequently leads to deterioration of biological systems or gets involved in modification of the existing metabolism. During this metabolism the modified molecules become activated and further cause damage to proteins or nucleic acids and tissues. Due to this, normal function of the individual varies and creates abnormality in the biological systems. Some of the chemicals that are involved to participate in this metabolism are Acetaminophen and Carbon tetrachloride (Shrirainshi, 1978).

The excess concentration of these chemicals can cause damage to defense system and modifies tissues and leads to cancer. To encounter the above damage the organisms have defense enzymes linked mixed function oxygenase, superoxide dismutase, catalase, peroxides, glutathione transferases, cystein transferase etc. These enzymes can participate either to catabolize the molecules or excrete them from the body. These enzymes are induced for secondary defense by using glutathione as primary substrate and the other chemical as secondary substrate.

Paracetamol and its derivative N-Acetyl-P-benzoquinone-imine are chemical toxicants. Paracetamol's hepatotoxic properties have been well documented. The enzymes induced in the presence of these chemicals are varied and are used as marker proteins to detect the chemical toxicity and carcinogenity.

To this end the investigator tested the hypothesis that sustained induction of GST enzymes in liver by Paracetamol is mediated by mechanisms due acute toxicity in the body. Persistent induction may enhance metabolism of PAH's leading to generate through redox cycling of increasing amounts of reactive species, which may cause oxidative DNA damage (Ichinose et al., 1997; Moorthy et al., 2000).
*Hybanthus enneasperatus* which is also known as *Ratnapurusha*, its root source is aphrodisiac drug and also known as *Ratnapurusha Lehyam*. Decotion or whole plant taken to improve memory, vitality, asthma, fever, leprosy. Shampoo made from this plant helps in removing dandruff. Similarly to known about the activity of leaves alone these works has been performed.

The objectives of the present study are

1. To purify the GSTs of mice liver tissues using glutathione linked sepharose column chromatography and characterize the polymorphic GSTs using a battery of substrates and electrophoresis analysis.

2. To study the expression of specific GST subunits and decide about the GST subtypes upon exposure of mice to paracetamol.

3. To study the active principle from the leaves of *Hybanthus enneasperatus*.

4. To know the elevation of antioxidant status and liver marker enzymes in the mice liver upon treatment of paracetamol and regulation of hepatotoxicity upon the oral administration of active principle of *Hybanthus enneasperatus*.

5. To know the effect of plant extract against DNA damage in blood by comet assay.

6. To know the histopathological studies of mice liver.