

Changes in the RNA content of gill and gonad tissues of *Corbicula striatella* due to 5-fluorouracil toxicity

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ABSTRACT

During the study of RNA contents of gill and gonad tissues in *Corbicula striatella* shows significant decrease in gill from 2.23 ± 0.059 to 1.96 ± 0.109 *(-12.107) for 15th day and on 30th day. There is significant decrease from 1.75 ± 0.113 to 1.31 ± 0.102 ** (-19.714) on gonad shows significant and decrease from 8.16 ± 0.951 7.16 ± 0.312 (-12.254 on 15th days and on 30th days there is a significant decrease from 7.33 ± 0.654 to 6.00 ± 0.328 ** (-18.144) on 30th day This is due to toxicity of 5- Fluorouracil and changes of RNA in mobilization of tissue in the cellular metabolism.

Keywords: RNA content, *Corbicula striatella*, 5- Fluorouracil

INTRODUCTION

RNA is capable of carrying out a multitude of diverse biological functions. Many biologically active RNA have to adopt intricate 3D structures that rival protein structures in their complexity to be functional in a cellular environment. 5- fluorouracil and Heavy metals may interact with RNA polymerases which causes adverse effect. RNA polymerase must bind site specifically to its DNA template, binds its nucleotide and primer substrate, and form new phospho diester bond in elongating the growing RNA. Zinc ion appears to be essential for the function of both RNA polymerase and DNA topoisomerase, (Giedroc and Coleman, 1989). Biochemical changes such as inhibition of enzymes, metabolic disorder, genetic damage, hypertension and cancer. (Underwood, 1971; Zemasky, 1974; Lucky and Venugopal, 1977). RNA is the polymer of the ribonucleotides held together by 3',5' phosphodiester bridge. RNA has certain similarities with DNA structure.

MATERIALS AND METHODS

Attempts have been made in this study to select Fresh water bivalves, *Corbicula striatella* were collected from of Girna dam which is about at the distance of 50 K.M. away from Chalisgaon City of Maharashtra state. First they are made acclimatized to laboratory condition and they are washed. The water in the aquarium was changed regularly after every 24 hours.

After the acclimatization, bivalves, *Corbicula striatella* were divided into two groups with equal numbers of animals. They were kept in separate aquariums for 15 and 30 days out of remaining one group treated by chronic Concentration LC_{50/10} value of 96 hrs.). Of 5-fluorouracil (3.716ppm). On 15th and 30th day of exposure, bivalves from each experimental group were sacrificed and gill and gonad, were removed. These tissues were dried in oven at 75 °C to 80 °C till constant weight was obtained and blended into dry powder. These powders were used for the estimation of biochemical components of RNA to observe efficacy of 5-fluorouracil.

Procedure- Estimation of RNA:-

RNA content of the tissue was estimated by following Orcinol method of Volkin and Cohn (1954). 10 mg of dry tissue powder was homogenized by adding 10ml distilled water. Then it was centrifuged at 3000 rpm for 10 minutes. The supernatant contains RNA. 1ml supernatant was taken in test tube and 3ml Orcinol reagent was added. Then the mixture in the test tube was boiled in boiling water bath for 15 minutes. After boiling the solution in the test tube was allowed to cool. The optical density of the colour developed was read at 665 nm filter. Array of increasing concentration of standard RNA solution was processed in the same way and the optical densities were read to calculate the concentration of RNA from the sample powder.

RESULTS

The above Experiment has concluded that the result obtained on 15 & 30 days of gill, and gonad with 5-fluorouracil are as follows.

15 Days treatment period (Subchronic)

The gill and gonad of *Corbicula striatella* shows a significant ($P < 0.01$) decrease. The gill shows control 2.23 ± 0.059 to treated with 5-fluorouracil $1.96 \pm 0.109^*$ mg/g wet tissues in treated. The total RNA content in gill and gonad corresponds to a decrease by 12.10% to 12.54%. The profile of total RNA content in gonad shows significant decrease from 8.16 ± 0.951 to $7.16 \pm 0.312^*$ mg/g wet tissues in gonad respectively. The gonad shows a decrease 12.54%. In both cases significantly decreases is recorded.

30 Days treatment period (Chronic)

The total RNA content of gill and gonad in control *Corbicula striatella* has been assessed. The result obtained 30th day after treating gill with the dose has shown significant in from 1.75 ± 0.113 to $1.31 \pm 0.102^{**}$ mg/g wet tissues. Secondly the result of gonad treated with 5-fluorouracil is significant decreases 7.33 ± 0.654 to $5.00 \pm 0.358^{**}$ mg/g wet tissues respectively.

Similarly 15 days subchronic exposure of treatment as compare to 30 days exposure shown that they are both tissues reveals significant depletion in RNA content. In the present comparative study gill, and gonad shows significant elevation in to the RNA level depletion in the exposure periods. This reveals a large variety of chemotherapeutic drugs used to treat cancer, but unfortunately many organic compounds shows limited efficacy problems of delivery and development of 5-fluorouracil is a conventional chemotherapeutic agent that binds co-valently to purine RNA bases and cellular apoptosis (Kerbel 1997).

The distinct types of the RNA with their cellular compositions are - messenger RNA 5-10%, Transfer RNA 10-20%, and ribosomal RNA 50-80 %. (Satyanarayana, 1999).

Table 1: Alterations in the RNA Content mg/100mg dry weight+ S.E. in digestive gland, and foot tissues of *Corbicula striatella* Treatment with 5-fluorouracil.

Sr no.	Tissues	Days	Control	Experimental	Student 't' test 'p' value	% increases (+) or decreases (-)
1	Gill	15	2.23 ± 0.059	$1.96 \pm 0.109^*$	$P < 0.01$	12.10%
		30	1.75 ± 0.113 4.61 ± 0.451	$1.31 \pm 0.102^{**}$	$P < 0.01$	19.14%
2	Gonad	15	8.16 ± 0.951	$7.16 \pm 0.312^*$	$P < 0.01$	12.54%
		30	7.33 ± 0.654	$5.00 \pm 0.328^{**}$	$P < 0.001$	18.14%

Divalent metal ions in general and Mg^{++} with its favorable charge/size ratio in particular (Woodson, 2005) play an important role in RNA folding. Mg^{++} ions not only stabilize the final structure through either direct coordination with negatively charged groups of the RNA or in a water-mediated interaction with the hexahydrated ion ($Mg(H_2O)_6^{++}$). They also influence the rate of folding, stabilize folding intermediates or destabilize alternative conformations (Wu and Tinoco, 1998). The effect of cisplatin damage on RNA pol II elongation was investigated using site-specifically-placed cisplatin adducts. In effective block to RNA pol. II elongation, inhibiting the polymerase by 80%. In contrast, RNA pol. II completely bypassed the cisplatin. These studies suggest the inhibition of RNA pol. II transcription following the treatment of cells with cisplatin (Carleen Cullinane *et al.*, 1999). In the light of above fact that *Corbicula striatella* was selected for biochemical study under sublethal concentration of Cisplatin for the subchronic (15 days) and chronic (30 days) period.

CONCLUSION

The present study indicates that effect of toxicity on *corbicula striatella* in the tissue of gills and gonads during the period 15 day and 30 days exposures of 5-fluorouracil anticancer drug toxicity to determine RNA reduced growth rate in enzymes of polymerase in RNA synthesis, which is the action of inhibit uracil base pair in subgroup of rRNA, tRNA, mRNA it has adverse effect of inhibitor of RNA transcription due to the period exposures. The toxicity of 5-fluorouracil in RNA reduced growth rate in polymerase enzymes. Then impact of toxicity determined in genetical disorders inhibit the uracil base pair in RNA. Which is the

adverse effect stop RNA transcription due to the period of 15 days and 30 days exposure.

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