Discussion
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In the present investigation the biological action of mother tincture and potentized forms (Mynca-30, Mynca-200) has been tested in a mammalian model, *Mus musculus*. Chronic feeding of carcinogens produced hepatic tumors at 60 days onward. The results of the present study showed that the administration of homeopathic drugs reduced the occurrence of tumors and also the number of mice that showed the incidence of liver tumors was less, as compared to those fed placebo. In general, both mother tincture and potentized forms had inhibitory influence on development of tumors, while the 30th and 200th potencies were apparently found to reduce the number of tumors at longer fixation intervals. The results also revealed that the carcinogen produced genotoxic effects like chromosome aberrations, micronuclei, sperm head anomaly, which were also supported by the preliminary study of comet assay. The carcinogens also induced more mitotic divisions of the bone marrow cells, which were more pronounced at longer fixation intervals, presumably as a result of more tumorigenesis and necrotic activity of the liver cells, demanding the replacement of blood cells lost due to tissue damage and necrosis. On the other hand, there were much less damages in the cytogenetical end points in the drug fed series of mice. Further, there was also a reduced rate in the mitotic index in drug fed mice, while in mice chronically fed with the carcinogens there was considerable change in genotoxicity status. The additional feeding of a little amount of succussed alcohol increased the scale of damage. Another feature, which was noticeable, is that the additional feeding of one nosode individually or two nosodes together did not apparently bring any additional benefit in the different parameters of study. A critical analysis of the different biochemical parameters studied revealed that the carcinogens produced cytotoxicity on chronic use, apparently increasing with the length of time, except for the parameters like GSH, catalase, succinate dehydrogenase. These are indicative of increasing hepatotoxicity with increasing time of feeding. On the other hand, in the entire drug fed series, there was less increase or suppression of increase in biomarkers like AST, ALT, AcP, AlkP, and LPO.
while there was an increase in GSH content and in the activity of catalase and succinate dehydrogenase. This also would lend support to the fact that the homeopathic remedies could positively influence the activities of the relevant biomarkers. The electron microscopic studies carried out on liver tissue of the drug-fed and placebo-fed carcinogen intoxicated mice would also support the view that the carcinogens brought about some specific ultra-structural changes in liver, suggestive of cellular injury and necrosis. However, the tissue damage and necrosis were less in magnitude in the drug-fed series. Thus, there was a positive correlation between the electron microscopic study of liver and enzymatic studies conducted in liver. In the nosode-treated group, there was no apparent additional beneficial action either for singly treated group or group treated conjointly with two nosodes. Similarly, all the blood parameters tested, as for example, blood glucose level, Hemoglobin, Cholesterol, etc., the homeopathic remedies also imparted some positive influence. Thus, when all results are taken into consideration in totality, it would suggest that both mother tincture and the potentized forms of *Myrica* had anti-tumorigenic, anti-genotoxic, anti-carcinogenic and hepato-protective effects on mice experimentally induced to develop liver tumor by chronic feeding of the carcinogens. So far as we are aware, the efficacy of the homeopathic drug *Myrica* had not been tested earlier, although this drug is prescribed by homeopathic practitioners occasionally in case of jaundice. Exhaustive experimentations have been carried out in p-DAB induced hepatocarcinogenesis by administering several other homeopathic remedies, like *Chelidonium majus* (Biswas and Khuda-Bukhsh, 2002, 2004, a, b, Biswas et al. 2005), *Lycopodium clavatum* (Pathak *et al.* 2006, 2007, Bhattacharjee *et al.* 2007) and it was found that the homeopathic remedies also combated carcinogenesis by way of ameliorating cytotoxicity, hepatotoxicity and genotoxicity to a considerable extent. However, how the ultra-low doses of homeopathic remedies can produce such spectacular results is an enigma. It is difficult at the present state of our knowledge to suggest any concrete mechanism of action of the homeopathic remedy. To explain the mechanism of action of the homeopathic drug, one has to explain
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several aspects of it. As for example, how the medicinal property is transferred to the vehicle by the repeated succussions is not known, although several hypotheses have been proposed (Anagnostatos et al 1994, 1998, Anick, 1998) Similarly it is also enigmatic how the sugar globules can contain information of the homeopathic alcoholic solution soaked on them. Another question that need proper explanation is how four to six small globules or a drop of homeopathic remedy diluted in water can bring about changes in multiple parameters. In this regard (Khuda-Bukhsh, 1997, 2003, 2006) advocated a hypothesis that the potentized homeopathic remedies possibly acted as "molecular switch" to regulate the expression of some relevant genes. He put forward both experimental evidences as well as circumstantial evidences in support for his hypothesis (Khuda-Bukhsh, 2006, Pathak et al 2007) The results of the present study also tend to support this hypothesis, but more works are necessary to reveal the precise molecular mechanisms of action of the homeopathic remedies and hopefully, the present works would stimulate other researchers to replicate our experiments to verify these results, and either confirm or refute, because if homeopathic drugs are experimentally proved to have anti-carcinogenic effects, then these can be used in cancer therapy.