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Hepatoprotective effect of *Achyranthes aspera* extract on non-alcoholic fatty liver in mice

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Non-alcoholic fatty liver disease is a common disease with accumulation of liver fat, and it occurs without the history of alcohol consumption, which has the same characteristics as alcoholic fatty liver and histologic findings. The aim of this study was to determine whether administration of *Achyranthes aspera* extracts (AAE) prevents diet induced nonalcoholic fatty liver disease. Male C57BL/6 mice (7 weeks old; initial weight 22.3 g) were randomly assigned into two groups after a 1-week adaptation period: normal control diet (CTL group) and high fat diet (HF group). CTL group and HF group freely received normal control diet and high fat diet respectively. After 12 weeks adaptation period, the HF group were assigned randomly to two groups and further fed an HFD (HF group) or an HFD supplemented with AAE (A500 group). After 4 weeks, we evaluated the body weight, serum metabolic parameters, and expression of mRNAs related to hepatic fatty acid uptake and de novo lipogenesis. The HF group exhibited higher weight gain throughout the body and liver than the CTL and A500 groups did. The HF group also showed greater expression of LXRα, LXRβ, SREBP1c, SREBP2, and C/EBPα mRNAs in the liver than the CTL and/or A500 groups. In addition, expression of ACC1, FAS, and SCD-1 mRNA in the liver were reduced, while expression of PPARγ mRNA was lower in the A500 group than in the HF group. Hepatic expression of p-AMPK/AMPK was higher in the A500 group than in the HF group. Accordingly, AAE prevents anti-inflammatory, anti-obesity and ameliorative liver fatty degeneration effects. This study provides novel information concerning the protective effect of AAE supplementation against obesity-induced nonalcoholic fatty liver disease.

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Controlling drug resistant bacteria using graphene/ceramics nanocomposites

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Antibiotic resistant bacteria are a serious threat to health not only in developing countries but also in developed countries. This is since bacteria gain resistance against traditional drugs over the time. A solution to completely eradicate different bacteria is presented in this work. Some novel nanocomposites that are comprised of graphene/X where X shows different ceramics i.e., MgO, SiO_2, Fe_3O_4 and NiO are tested for their performance against different bacterial strains. A comparative study of these nanocomposites is presented in this work to inhibit the growth of Gram negative and Gram-positive bacteria. By variation of amount of graphene in different nanocomposites is presented. It has been found that the growth of all the three bacterial strains under consideration, i.e., *E. coli, S. aureus,* and *P. aeruginosa* was completely inhibited by graphene/ NiO nanocomposites. Graphene/Fe_3O_4 also showed good antibacterial activity. However, graphene/ MgO and graphene/SiO_2 showed only a moderate activity. In the light of findings, graphene/ NiO nanocomposites can be considered as an innovative material that provides an alternative for the eradicating drug resistant bacteria.

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