

عنوان مقاله:

Evaluation of epigenetic changes of liver tissue induced by oral administration of Titanium dioxide nanoparticles and possible protective role of Nigella Sativa oil, in adult male albino rats

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خلاصه مقاله:

Objective (s): Titanium dioxide nanoparticles (TiO₂ NPs) have been recognized as biologically inert material and have been used in a multitude of applications. Nevertheless, the negative impact on the human health is not yet well understood. Aim of the work: The study attempted to evaluate the epigenetic changes of the genome, in the form of DNA methylation in liver tissue samples, resulting from oral administration of TiO₂ NPs (mixed rutile and anatase) in adult male albino rats. Furthermore, whether the Nigella sativa oil (NSO) can prevent the toxic effects of TiO₂ NPs. Materials and Methods: Thirty-two adult male albino rats were divided into four groups. (I) control, (II) nigella sativa oil, (III) TiO₂ NPs and (IV) TiO₂ NPs + nigella sativa oil. The impact of TiO₂ NPs on the global DNA methylation and the oxidative status were assessed. Results: Among the study groups, TiO₂ NPs exposure provoked oxidative stress; increased blood levels of MDA and decreased reduced glutathione (GSH) level. The global DNA methylation levels decreased after exposure to titanium nanoparticles. Significant differences were recorded between the control group and the group receiving TiO₂ NPs. Marked improvement was noticed after supplementation of nigella sativa oil in terms of DNA methylation and oxidative stress markers. Conclusion: Oral administration of TiO₂ NPs caused global DNA hypo-methylation in liver tissue samples. The epigenetic damage raises the concern about the safety associated with applications of the TiO₂ NPs. The maintenance of DNA methylation patterns by Nigella sativa oil has a role in protection against genomic instability.

کلمات کلیدی:

DNA methylation, Epigenetic, Nanotoxicity, Titanium dioxide

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