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Iron overload induces damage of global DNA and *TP 53* in human lymphocytes

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High iron consumption is associated with an increased risk of cancer possibly via production of reactive oxygen species (ROS) which in turn induces oxidative damage to lipids, proteins and DNA. The aim of the study was to determine whether Fe-NTA causes DNA damage and targets *TP 53* in human peripheral lymphocytes. Human lymphocytes were treated with Fe-NTA (1-500 μM) for 30 min at 37 ℃. Global DNA damage and oxidised bases were measured using the comet assay. Specific migration of *TP53* was detected after fluorescence *in situ* hybridization (comet FISH). The comet assay experiments showed that Fe-NTA was clearly dose-dependent genotoxic effect in lymphocytes without cytotoxicity. For 500 μM Fe-NTA, tail intensity of 34.1 ± 7.4 % was scored (negative control 9.8 ± 3.2 %). Higher concentration of Fe-NTA led to an enhanced migration of *TP53* signal into the comet tail in lymphocytes (500 μM Fe-NTA 24.9 ± 5.5 %, negative control 6.9 ± 2.5 %). In conclusion, Fe-NTA can induce global DNA damage and enhance the migration of the tumor suppressor gene *TP53* in human lymphocytes.