

Table S1. HepG2 cell viability after treatment with serial concentrations of Ru<sup>III</sup>/Q, Q, and D-galactose.

Concentration ( $\mu\text{g/mL}$ )	Viable cells (%)		
	Ru <sup>III</sup> /Q	Q	DG
5	90.57 $\pm$ 0.35	98.98 $\pm$ 1.54	99 $\pm$ 1.63
10	68.69 $\pm$ 1.63	97.74 $\pm$ 3.04	94.55 $\pm$ 3.73
20	46.69 $\pm$ 0.82	94.2 $\pm$ 1.81	95.52 $\pm$ 4.78
40	28.86 $\pm$ 2.33	90.17 $\pm$ 2.49	96.43 $\pm$ 4.43
80	22.40 $\pm$ 2.57	80.42 $\pm$ 1.77	97.14 $\pm$ 3.38
160	20.29 $\pm$ 3.5	69.64 $\pm$ 2.25	97.43 $\pm$ 2.8
320	17.14 $\pm$ 3.38	62.67 $\pm$ 2.08	98.29 $\pm$ 2.68
640	15.86 $\pm$ 2.33	51.29 $\pm$ 1.77	99.71 $\pm$ 2.22
1280	14.87 $\pm$ 1.65	50.36 $\pm$ 2.58	100 $\pm$ 3.52

Table S2. Histological activity index (HAI) was assessed based on the degree of microscopic lesions in testis tissues as the effect of DG and Q and/or Ru<sup>III</sup>/Q separately or in combination.

Findings	Groups					
	Control	DG	Q	Ru <sup>III</sup> /Q	DG+Q	DG+Ru <sup>III</sup> /Q
Normal seminiferous tubules	++++	-----	+++-	++++	—+	+++-
Leydig cells hyperplasia	-----	++++	—+	-----	—+	---+
Myoid cells	++++	-----	+++-	++++	—+	+++-
Several layers of spermatogenic cells	++++	-----	+++-	++++	++-	+++-
Few spermatids (azospermia)	-----	++++	+++-	-----	+++-	---+

Maturation arrest	-----	++++	+++	-----	+++	---+
Ruptured seminiferous tubules	-----	++++	+++	-----	+++	---+
Leydig cells	++++	---+	+++	++++	+++	+++

– no found; ---+ found in 1–3 rats; +++ found in 4–6 rats; +++- found in 6–7 rats ,  
++++ found in 7-8 rats at least(n=10).

Table S3. Histological activity index (HAI) was assessed based on the degree of microscopic lesions in brain tissues as the effect of DG and Q and/or Ru<sup>III</sup>/Q separately or in combination.

Findings	Groups					
	Control	DG	Q	Ru <sup>III</sup> /Q	DG+Q	DG+Ru <sup>III</sup> /Q
Normal neurons and pyramidal cells	++++	-----	+++	++++	+++	+++
Necrotic area	-----	++++	—+	-----	---+	---+
Congestion and Hemorrhage	-----	++++	---+	-----	+++	---+

– no found; ---+ found in 1–3 rats; +++ found in 4–6 rats; +++- found in 6–7 rats ,  
++++ found in 7-8 rats at least(n=10).

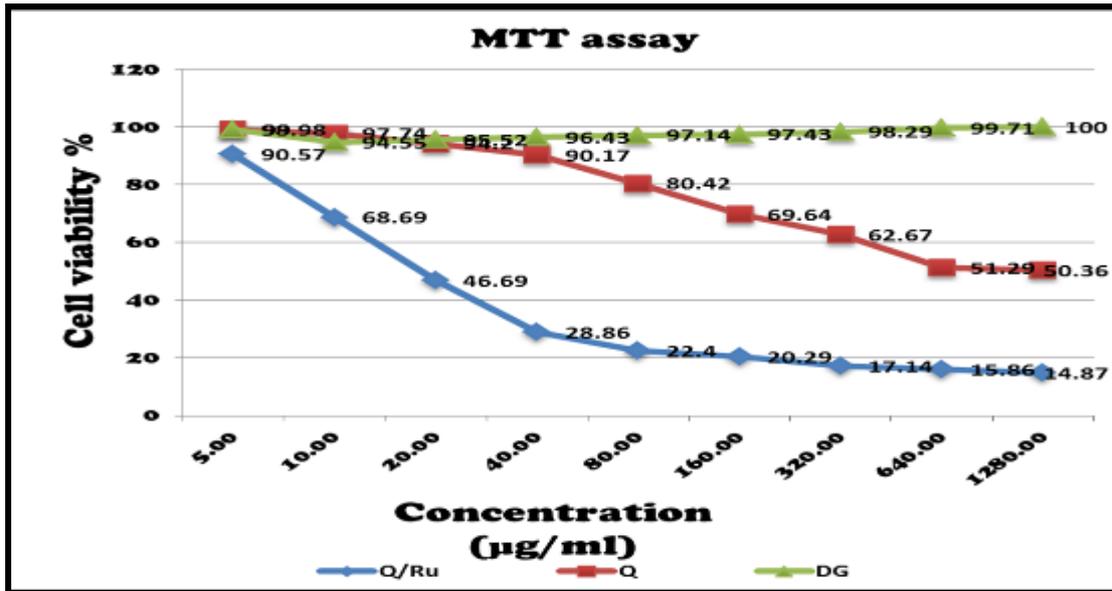


Figure S4. HepG2 cell viability after treatment with serial concentrations of Ru<sup>III</sup>/Q , Q, and DG.

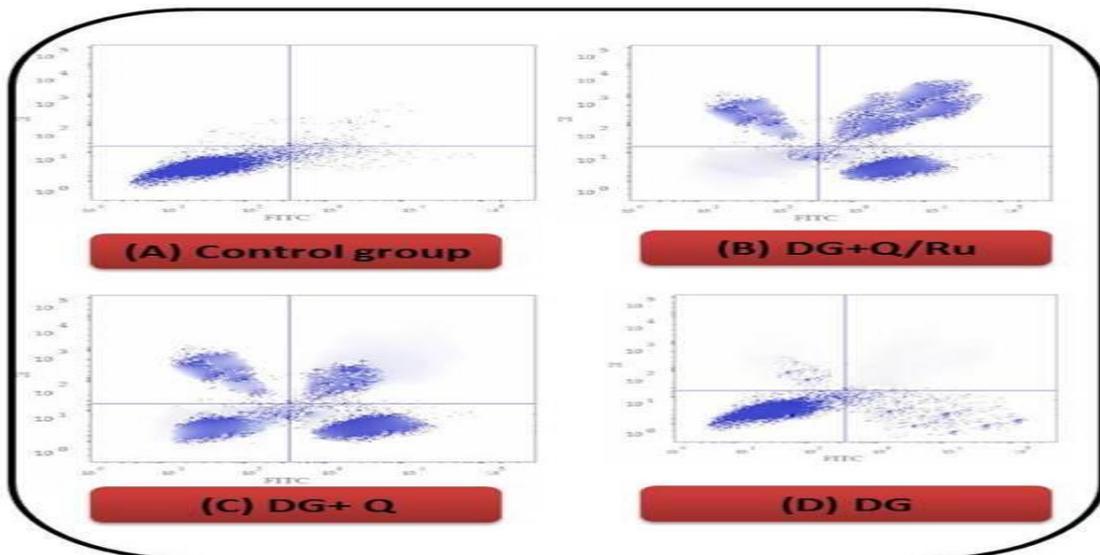


Figure S5. Apoptotic effect (FITC-Annexin V) in control and treatment with Ru<sup>III</sup>/Q , Q and DG of HepG2 cells. Upper left quadrant shows necrosis (cell debris), upper right quadrant shows late apoptotic cells. Viable cells are detected in the lower left quadrant and early apoptosis is detected in the lower right quadrant. Mean ± S.D. for three independent tests.

- a. Untreated /HepG2 cells (Control untreated group).
- b. Ru<sup>III</sup>/Q /HepG2 cells.
- c. Q/HepG2 cells.
- d. DG / HepG2 cells (Control

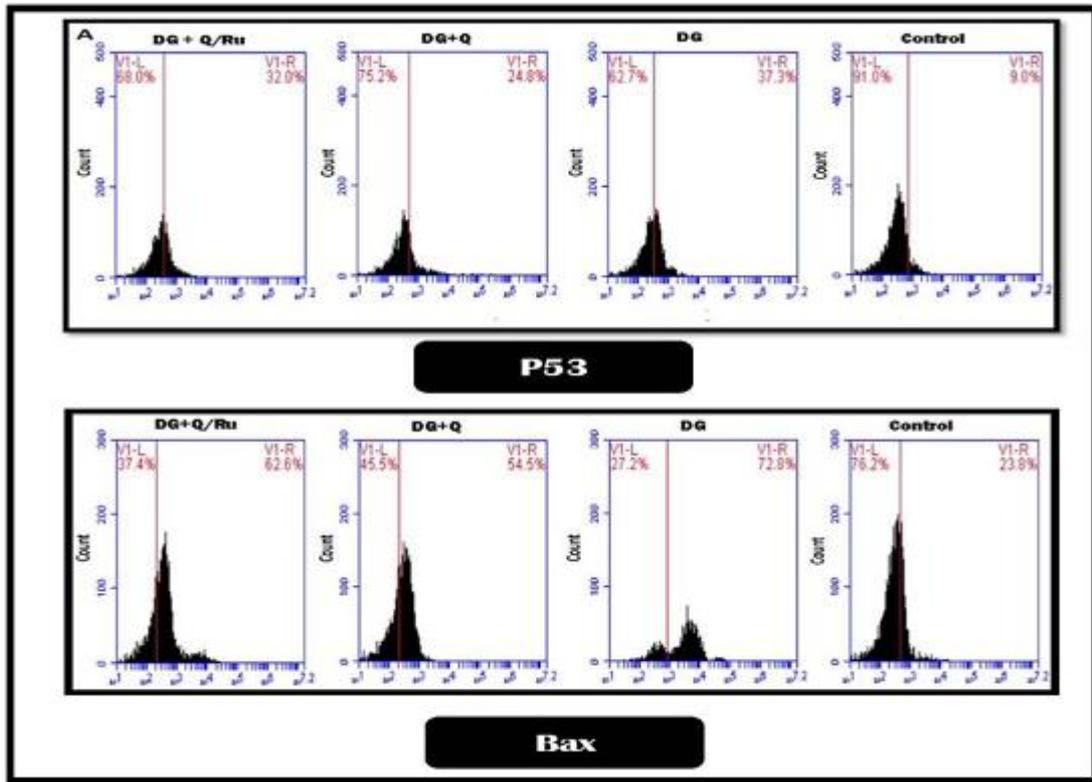


Figure S6. Representative flow cytometric histogram on percentage of P53 and Bax expression in HepG2 cells.

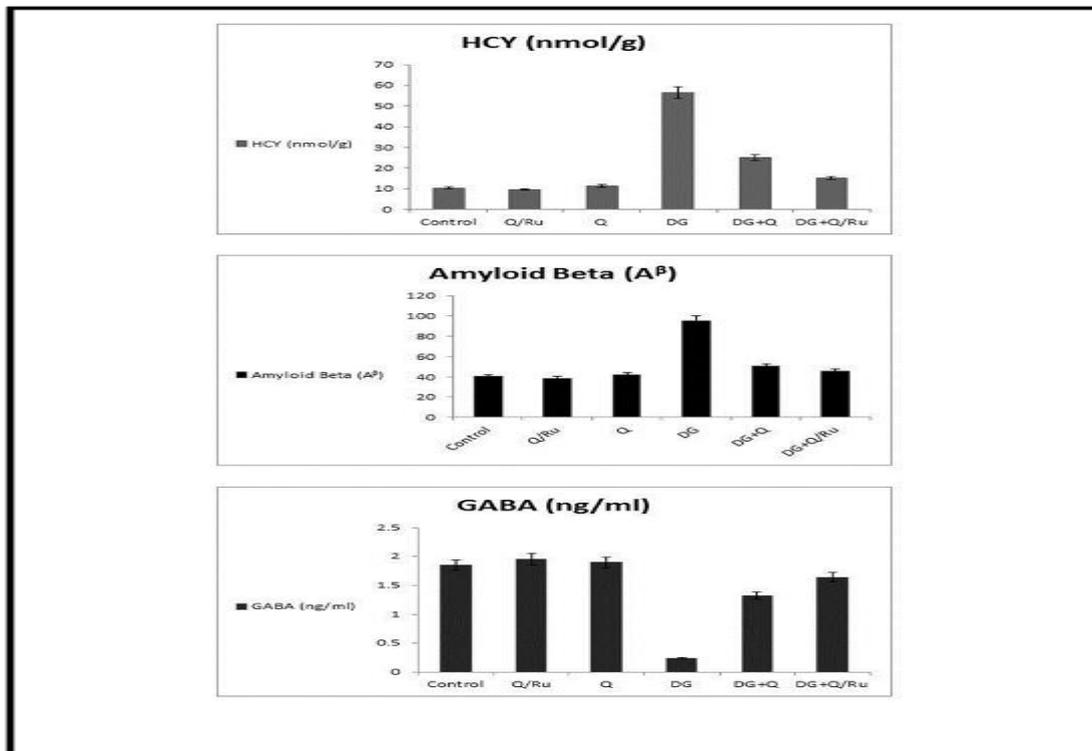


Figure S7. Effect of DG, Q and Ru<sup>III</sup>/Q alone or either combined on HCY , Amyloid Beta and GABA levels.

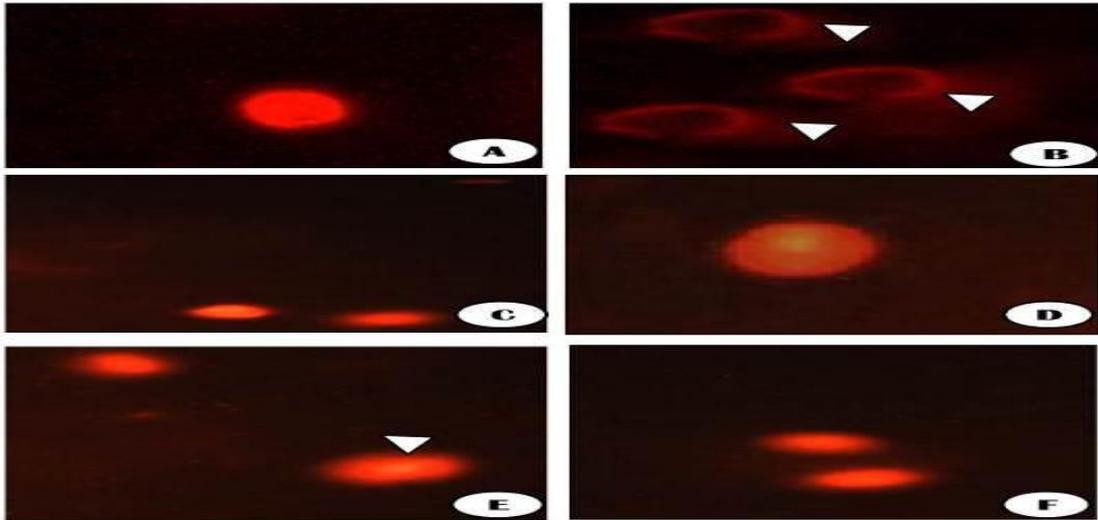


Figure S8. The microscopic images of representative comets for the effect of DG , Q and Ru<sup>III</sup>/Q on the percentage of DNA using the comet assay. Comet images of cells derived from the brain of rat of group (A) control group which showed intact nuclei and normal round cell . (B) DG showed more damaged DNA with appearance of comet hallow (White head arrow) (C) Q group showed intact DNA strands (D) Ru<sup>III</sup>/Q which showed more intact appearance DNA strands (E) DG+Q which showed amelioration of the cells as recorded less parameters in the tail length and % of damaged DNA and tail (White head arrow) (F) DG+Ru<sup>III</sup>/Q showed more percent of intact cells with undamaged DNA and less numbers of comet cell.

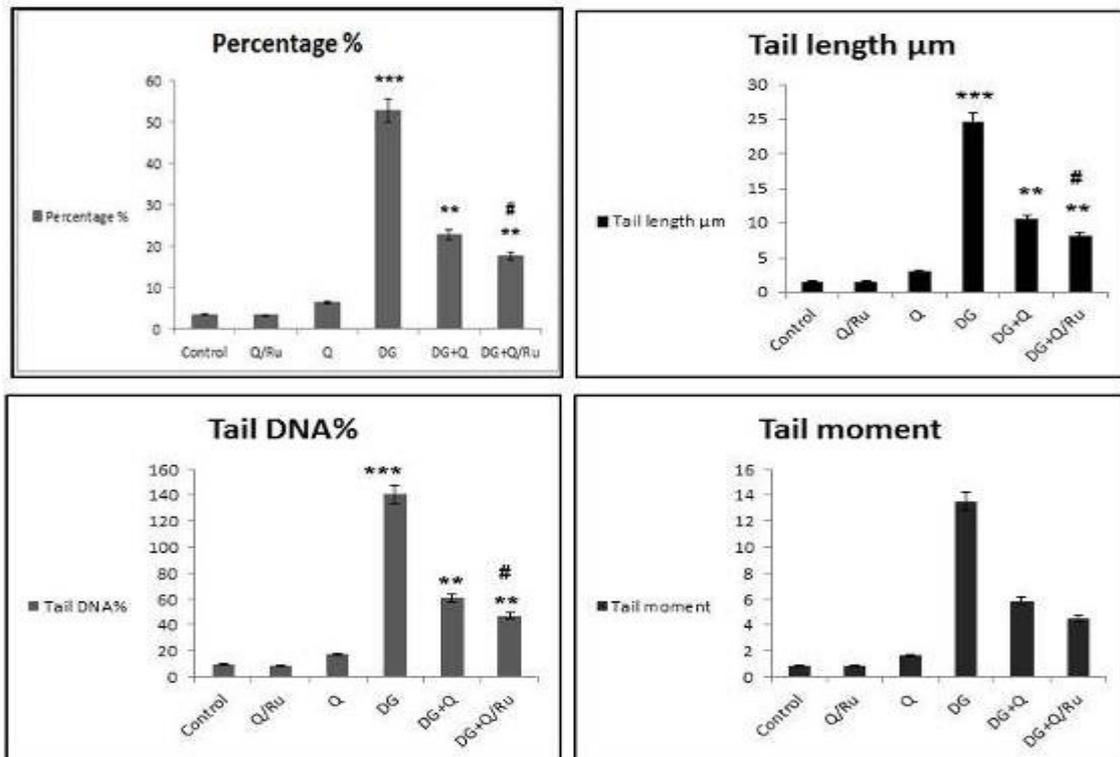


Figure S9. The effect of DG , Q and Ru<sup>III</sup>/Q on the percentage of DNA Damage by using the comet assay.