

## Evaluation of caffeine as a radioprotector in gamma-irradiated C57BL/6N male mice

Jihyang Kim, Yong Dal Yoon  
Hanyang University, Seoul, 133-791, Korea

Jin Kyu Kim  
Korea Atomic Energy Research Institute, Taejon, 305-353, Korea

### Abstract

Caffeine is the main psychoactive ingredient of coffee, tea, even colas with a high frequency of concurrent use in humans. Caffeine has been recently reported as a scavenger of hydroxyl radical in millimolar levels and a potential radioprotector in chronically exposed rodent. This study was performed to investigate the functional radioprotection of caffeine in gamma-irradiated mice. Eight-week-old male C57BL/6N mice were irradiated with 6.5 Gy. A caffeine treated group was administrated 80 mg/kg body weight by *i.p* injection, a single exposure, at 1 hour before irradiation. The remaining mice were kept as sham controls. At 6 hours after irradiation, we measured the body and organ weight, collected serum, and testes were removed and processed for paraffin sections and isolation of total RNA. Hormonal analysis was performed by means of radioimmunoassay (RIA) in serum. Semiquantitative reverse transcription-reverse chain reaction (RT-PCR) was used to evaluate the expression kinetics of the apoptotic genes after irradiation. The weight of body and organ and H-E stained slide did not show a difference between groups. The circulating testosterone significantly decreased in irradiated group. RT-PCR data represented that the expression of Fas antigen, p21, p53, bax, and bcl2 related radiation-induced apoptosis showed the specific patterns comparable to that of caffeine-untreated group. Specially, bax mRNA dramatically increased in irradiated group, except caffeine-treated irradiated. Taken together, caffeine can protect an early apoptotic initiation against gamma radiation and may act as a radioprotector.