Purpose: To investigate the radiosensitization of superficial kilovoltage range of x-ray energy and megavoltage electron beams due to the presence of gold nanoparticles (AuNps) using cell survival curves and normoxic polyacrymide gel (nPAG). **Method and materials:** Bovine aortic endothelial cells (BAECs) with and without AuNps were irradiated with kilovoltage superficial x-ray beams and megavoltage electron beams. Cell survival at various concentrations of AuNps (0.25mMol -1mMol) was measured using colorimetric assay. Level of dose enhancement for x-ray and electron beams was also quantified using AuNps doped nPAG. **Results:** AuNps enhanced the cells killing up to 21 fold for 1mMol of AuNps irradiated with 80 kVp x-ray beams. Maximum dose enhancement factor (DEF) of 4.63 was measured for 12 MeV electron beams in the presence of 1mMol AuNps. 80 kVp which represents effective beam energy of around 40 keV was the optimum energy found that yield highest enhancement ratio. Measurements using AuNps doped nPAG also exhibit higher polymerization resulting from increased photoelectric interactions, Auger electrons and characteristic x-ray generation. The experimental dose enhancements obtained were also in agreement with theoretical calculation and those previously documented for iodine atoms. **Conclusions:** Both experiments with cell culture and nPAG confirm that AuNps are able to enhance the radiation dose for x-ray and electron superficial therapy. Lower doses from external sources are required to produce the same radiation effect with AuNps compared without application of AuNps. This will lead to improvement in superficial radiotherapy techniques of both x-ray and electron. The use of this technique with microbeam radiotherapy technique and kilovoltage type intraoperative radiotherapy techniques are now under investigation in our group.