CLAIMS

1. Use of a population of gold (AU) nanoparticles to prepare a pharmaceutical composition for use in a method of perturbing, altering or destroying target mammalian cells *in vivo*, selected from the group consisting of benign cells, pre-malignant cells and malignant cells, when said cells are exposed to ionizing radiations, wherein the mean largest size of a nanoparticle of the population is between about 80 and 105 nm, and wherein the gold nanoparticle is covered with a biocompatible coating.

2. Pharmaceutical composition comprising a population of gold nanoparticles for use in a method of perturbing, altering or destroying target human cells in vivo, selected from the group consisting of benign cells, pre-malignant cells and malignant cells, when said cells are exposed to ionizing radiations, wherein the mean largest size of a nanoparticle of the population is between about 80 and 105 nm, and wherein the gold nanoparticle is covered with a biocompatible coating.

3. Use according to claim 1 or pharmaceutical composition for use according to claim 2, wherein the biocompatible coating is a non-biodegradable coating selected from the group consisting of: silica, alumina, sugar, phosphate, silane, thiol, switterionic compound, lipid, saturated carbon polymer, and an inorganic polymer; or a biodegradable coating selected from the group consisting of: biological polymer, phospholid, saccharide, oligosaccharide, and polysaccharide.

4. Use according to claim 1 or pharmaceutical composition for use according to claim 2, wherein the composition comprises between about 10^{-6} nmole and 10^{-3} nmole of gold per target cell.

5. Use according to claim 1 or pharmaceutical composition for use according to claim 2, wherein the nanoparticle comprises a surface component enabling specific targeting of biological tissues or cells.

6. Use according to claim 1 or pharmaceutical composition for use according to claim 2, wherein the nanoparticle is essentially spherical or ovoid in shape.

7. Use according to claim 1 or pharmaceutical composition for use according to claim 2, wherein said ionizing radiations are selected in the group consisting of X-Rays, γ-Rays, electron beams and radioisotope emissions.

8. Use or pharmaceutical composition for use according to claim 7, wherein the ionizing radiations are of about 50 KeV to about 12 000 KeV.

9. Use or pharmaceutical composition for use according to claim 7, wherein the X-Rays radiations are of about 50 KeV to 6000 KeV.

10. Use according to claim 1 or pharmaceutical composition for use according to claim 2, wherein said human malignant cells are cells from a solid tumor.

11. Use according to claim 1 or pharmaceutical composition for use according to claim 2, wherein the pharmaceutical composition further comprises an additional therapeutic compound intended to treat cancer, said additional therapeutic compound being distinct from the population of gold nanoparticles.