Dosimetry in radiobiology

* The unit of exposure, X, is taken as the quotient of ∆Q divided by ∆m, where ∆Q is the sum of electrical charges on all the ions of one sign that are produced in the medium when all the electrons liberated by photons in a volume element of the medium, the mass of which is ∆m, are completely stopped in the volume:
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* The special unit of exposure that predates the SI system is the roentgen(R). There is no SI unit for exposure, and although it is still occasionally encountered, particularly in the older literature, the old special unit, roentgen, is no longer used.
* Absorbed dose, D, is defined as the quotient of ∆ED divided by ∆ m, where ∆ED is the energy deposited (E0 equals energy imparted, vide infra) by ionizing radiation to the mass, ∆m, of matter in a volume element:
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* The special unit of absorbed dose that was widely used until 1977 is the rad: 1 rad = 100 erg g-1. The plural unit is also rad; for example, 1 rad or 20 rad. The rad is still widely used even though the new special unit the gray (Gy) has been introduced. The gray is defined as the deposition of 1 J in 1 kg: 1 Gy = 1 J kg-1. The gray is slowly supplanting the rad in modern literature, and I will attempt to use it consistently in this text. The interconversion of the rad and the gray is simple because 1 Gy = 100 rad, which leads to the immediately obvious equality 1 rad = 1 cGy. As a result, many radiation scientists have popularly adopted the centigray for scientific communication.