



Figure 31. Reprogramming of somatic cells to pluripotency. (A) During the lifetime of an individual, epigenetic modifications (mod) are acquired in different cell lineages (*left*). Nuclear transfer (NT) of a somatic cell reverses the process of terminal differentiation, eradicating the majority of epigenetic marks (mod); however, some modifications that are also present in the germline (g-mod) may not be removed. (*Right*) During neoplastic transformation (from a normal to tumor cell), caused by a series of genetic mutations (red stars), aberrant epigenetic marks (mod) accumulate. These epigenetic alterations, but not the DNA mutations, can be erased through reprogramming on NT. (B) Reprogramming of somatic cells (fibroblast) into iPS cells by the transduction of four pluripotency factors (Oct4, Sox2, Klf4, c-Myc), also called “Yamanaka” factors. Treatment of somatic cells with epigenetic inhibitors or vitamin C enhances reprogramming efficiency. (A, R Jaenisch, pers. comm.)