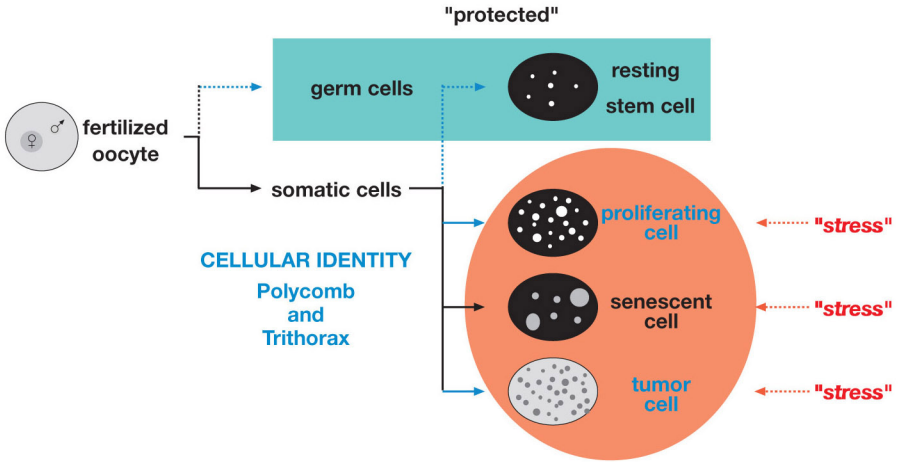

Figure 16. Cellular Identity by PcG and trxG Proteins

Two cell compartments are established during embryogenesis, distinguished by their differentiation potency: They are germ cells (totipotent) and somatic cells (including stem cells) with restricted differentiation potentials. The plasticity of a germ or stem cell's genome expression potential is reflected in reduced levels of repressive histone marks which are no longer visible at pericentromeric foci. Normal proliferating cells typically have a nuclear morphology showing 15–20 heterochromatic foci. Polycomb- and Trithorax-containing complexes operate in specifying the epigenetic and, hence, cellular identity of different lineages. They also function in response to external "stress" stimuli, promoting cellular proliferation and appropriate gene expression. Loss of genome plasticity and proliferation potential occurs in senescent (aging) cells, reflected by abnormally large heterochromatic foci and an overall increased level of repressive histone marks. Highly proliferating tumor cells, however, exhibit changes in the balance of repressive and activating histone marks through the deregulation of PcG and trxG histone-modifying enzymes. This is accompanied by perturbed nuclear morphology.