mitogen-stimulated proliferation, impairment of colony-forming capacity, changes in dealkylase activity of cytochrome P450, accumulation of 8-oxo-2′-deoxyguanosine (a known biomarker of aging) in the DNA, increase in the number of cells with senescence-associated beta-galactosidase activity (the most popular biomarker of cell senescence), and inhibition of poly(ADP-ribosyl)ation of chromatin proteins.[5,33,63–71]

It should be emphasized that such experiments can be performed with cells of different origin, including human and animal cells, bacteria,[72,73] yeasts (currently most widely used in experiments on "stationary phase aging"[74]), plant cells,[33] microalgae,[75] and mycoplasmas.[76,77] This provides a basis for the evolutionary approach to the analysis of experimental results.[78] Moreover, the "age-related" changes in cells of stationary cultures can be revealed within a relatively short time: as a rule in 2–3 weeks after the start of the experiment.

The stationary phase aging of yeasts is called "chronological aging" and is most frequently studied in *Saccharomyces cerevisiae*. It is observed in a population of yeast cells in the stationary phase of growth when their proliferation is stopped in one way or another.[79] In this case, the viability of cells is usually estimated by their ability to form colonies in a fresh growth medium.[80] The chronological aging of yeasts should be distinguished from their so-called "replicative aging". The latter is based on the phenomenon of a limited number of daughter cells that can be generated by one mother cell. This model is very similar to the Hayflick model. However, unlike the cultured human and animal cells, the daughter cell of the yeast *Saccharomyces cerevisiae*, which is typically much smaller than the mother cell, is formed as a result of asymmetric budding. In this case, the mother cell loses its ability for such budding after a certain number of divisions and then undergoes degradation and lysis, and the daughter cells "are born very young." This process is similar to the aging of the stem cell pool in higher organisms.[81] It should be noted that, for the yeast *Schizosaccharomyces pombe*, in which two identical daughter cells are formed as a result of symmetrical division (fission) of one mother cell, only the chronological aging model can be used.[82]

It is important that in studies on the Hayflick model it is fairly difficult to correctly perform repeated experiments with the same cell strain because the cells continuously change from passage to passage ("no man ever steps into the same river twice"), whereas the "stationary phase aging" model allows, as already mentioned above, experimentation with transformed (or normal but immortalized) animal and human cells with an unlimited mitotic potential so that multiple replication of an experiment is no longer a problem.[83]

4.3 Constructing of Survival Curves for Cultured Cells in Cytogerontological Experiments

During many years of research on the "stationary phase aging" model, our premise was that cultured cells whose proliferation is restricted in some way (preferably by contact inhibition) accumulate "age-related" defects similar to