

I am interested in learning more about the phenomenon of apoptosis (programmed cell death) and how it relates to death from old age in eukaryotes, especially in humans. Apparently human somatic cells have been found to divide about 50 times before they die (“Hayflick limit”). This Hayflick limit is in turn apparently linked to the erosion of the telomeres, which is in turn a consequence of the eukaryotic DNA being linear. It seems like there is data showing the link between the rate of cell divisions and the length of telomeres.

Given the above mentioned information, it seems to me that I could estimate the number of allowed cell divisions in humans (i.e the number of cell divisions whereby a critical percentage of the body’s cells have completely eroded their telomeres and have therefore reached their Hayflick limit) and from that calculate the expected lifespan of humans who die of old age. This would give the lifespan of humans if the erosion of telomers in their somatic cells was the only factor.

This topic seems interesting because it relates to evolution, the role of sex in mortality, the comparison between eukaryotic and prokaryotic notions of mortality, etc. My concern is that the above mentioned quantitative part might be a little fuzzy and might not include rigorous stat mech. Can you suggest some other angle related to this topic that would be conducive to quantitative thinking? If not, I might think of some other topic.