Synopsis: I am studying on whether or not the S-phase of budding yeast will be by passed by caffeine treatment after the yeast is arrested and delayed with hydroxyurea and UV light.

Abstract: Cdc7/Dbf4 complex is critical to the DNA replication process in S-phase of S. cerevisiae. Therefore, if this complex is interfered by genotoxic stress, the whole progress will be stopped, and its S-phase checkpoint will be initiated. In my experiment, I will expose budding yeast to ultraviolet light and hydroxyurea to trigger S-phase delay and arrest respectively. After their effects are detected, I will apply caffeine to the Cdc7/Dbf4-damaged budding yeast. Many research articles have supported that caffeine can bypass the S-phase checkpoint caused by mutagenic stress in fission yeast. In S. pombe, Cds1 and Chk1 initiate S-phase checkpoint upon hydroxyurea treatment. In order to override S-phase checkpoint, caffeine interferes with Rad3 kinase which administers the functions of Cds1 and Chk1 (Moser, etc. 2000). Since many of the effects on the cell cycle are universal, S. cerevisiae would likely react in a similar manner as fission yeast to caffeine treatment. Therefore, this research paper will concentrate on testing whether or not caffeine supports S. cerevisiae to circumvent cell arrest and delay. However, overriding S-phase checkpoint is most likely a mechanism that promotes the growth of cancerous cells.