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The overall purpose of this project is to quantitatively analyze DNA double strand break repair while comparing Non-Homologous End Joining (NHEJ) and Homologous Recombination (HR). Two DNA samples will be digested, removing specific portions to ligate together. The DNA samples are the HPRT Targ Inverted Blunt Nhe1 DNA sample and the NHEJ Inverted -CMV newPoly sample. Following the created DNA plasmid will be combined with the pRRL viral vector in order to insert in the HIV lentivirus vector. This lentivirus vector will be used to incorporate the created DNA plasmid samples into mammalian cells where Icu1 will be used to stimulate DNA DSB and the GFP protein will marker NHEJ and HR efficiency. The results showed a 100% efficiency in DNA plasmid cloning, 80% efficiency in plasmid + pRRL viral vector cloning, and 50% efficiency in correct viral vector orientation for insertion into HIV lentivirus.