

Germline topic: **Using CRISPR to edit the germline in cancer patients**
(Rep. Jada Wilson)

Genetic diseases like cancer can be transferred to offspring and this has created fear in some because they don't want those mutations to be transferred into their children's genome. The level of susceptibility to cancer depends on the proportion of individuals with a certain mutation and the type of inherited allele. With the advances of CRISPR/Cas 9 and TALENs this fear can be fixed because modifications can be done on the actual gametes or embryo. CRISPR can be used to cleave unwanted mutations and then repairs can be done either by Homology-directed repair (HDR) or Non homologous end joining (NHEJ). The difference between these two repairs is HDR is more precise since it must have a homologous template to repair the cleavage and NHEJ is able to make insertions without a template. In order to examine the efficiency of CRISPR a scientist did an experiment on zygotes. Different concentrations of the the guide RNA and Cas 9 were inserted into the zygote. In order to examine if Cas 9 was properly cleaving the embryos PCR was amplified and the indels were analyzed by T7 assay.

Liang, Puding et al. "CRISPR/Cas9-mediated gene editing in human tripronuclear zygotes." *Protein & cell* vol. 6,5 (2015): 363-372.

Experiment done on human zygotes

R. Vassena, B. Heindryckx, R. Peco, G. Pennings, A. Raya, K. Sermon, A. Veiga, Genome engineering through CRISPR/Cas9 technology in the human germline and pluripotent stem cells, *Human Reproduction Update*, Volume 22, Issue 4, July/August 2016, Pages 411–419

Review of the technical aspects of CRISPR and TALEN.

Gomy I, Del Pilar Estevez Diz M. Hereditary cancer risk assessment: insights and perspectives for Next-Generation Sequencing era. *Genet Mol Biol*. 2016;39:184-188.

Discussed the way passed down alleles have a say in how likely a person is to get cancer.

Houlston RS, Peto F. The search for low-penetrance cancer susceptibility alleles. *Oncogene*. 2004;23:6471-6476.