The Gene - Siddartha Mukherjee

This book gives an overview of the human gene and the implications which could ensue from the ability to manipulate our genetic code. The book has a unique narrative style, the book is splitinto six parts. charting scientific studies into the human gene from around 1866 to the present day. Each of the parts focuses on the discoveries made within a specific time period. Mukherjee begins with a story close to his home, ~~his family~~ he had a cousin named Max who is diagnosed schizophrenic and they do not believe that it is hereditary. The book begins with the story of George Mendel. Mendel ran experiments in his flower garden pertaining to genetics. Mukherjee then goes on to give an overview on the mechanistic aspects of the gene. This is that genes are the basic unit of heredity. They are the biological language that is used to build, maintain and repair organisms. Genes encod chemical messages to build proteins and repair organisms. Genes encod chemical messages to build proteins that ultimately enable the form and function. Physical characteristics of an organism are determined by a combination of its genetics and environments. Phenotypes are physical or biological attributes of an organism the equation which Mukherjee mentions to obtain ~~the~~ a holistic representation of how a phenotype is formulated is as follows Genotype + enviroment + triggers + chance = phenotype. Mukherjee goes on the state how one of the most important things related to genes is the reason mutations that come

from them. This heterogeneity allows for selective pressures to ensue, hence attempts at increasing homozygosity are not the most conducive strategies. Mukherjee also touches on the threat of genetic testing to see whether individuals have a disease especially in the case of diseases such as Huntington's disease.

Another thorny moral concept pertaining to genetics which is that of eugenics. Eugenics left a big imprint on the 20th century, throughout the horrible action of Hitler in World War 2. Although eugenics has been used as a taboo for the negative Mukherjee also touches on the inverse, that is positive eugenics. Positive eugenics give the possibility of utilizing the ability to sequence genes to improve the overall genomic makeup of our species. An interesting question which was raised is whether or not we should use such technologies like CRISPR to manually improve the genomic makeup of our species, this has some corollary to the no free lunch theorem in machine learning as if you do manually improve the genes then you also decrease the heterogeneity of the population. Overall this is a great book which gives a proper background on the history and understanding of the various mechanistic features of the gene.