Capstone Presentation List

Tableau story

**Introduction**

1. Introduction
   1. Genomes dedication to methylation
      1. Something that’s extremely important in the physiological equilibrium
2. Methylation? What is it?
   1. Discuss the point of turning genes off
      1. Why its good to have genes turned off
   2. How methylation works
      1. CGG sites, CpG islands
3. Calico Cat
   1. A living example of methylation patterns
      1. One x chromosome is activated in black fur, the other inactivated
      2. Vice versa for orange fur

**Analysis**

1. Genes per chromosome – wanted to start out with a basic understanding of genes in each chromosome
   1. Bar chart - list of genes per chromosome
      1. Immediately, chromosome 1 and chromosome 19 stick out as having the most genes
   2. Color coded table – average transcript length per chromosome
      1. Chromosome 1 and 7 have the longest gene transcripts
      2. Chromosome 19 is not in the top 50%
         1. Why??
2. CpG island length per chromosome – analyzing CpG islands per chromosome
   1. Box n whisker – shows the median CpG island size is ~1mil CGG
      1. Chromosome 19 sticks out again
   2. Peak M value – shows methylation level of each CpG region
      1. Chromosome 19
3. Chromosome 19 – why is it repeatedly sticking out?
   1. Pie chart of promoter classification
      1. Majority are HCP, high CpG promoter
4. What diseases are associated with methylation?
   1. Fragile X Syndrome
   2. Due to a mutation of the FMRP protein, insertion of the ‘CGG’ repeats we talked about earlier
   3. Bar chart - Peak M values of FMRP proteins
      1. Highly methylated compared to the average M values of the entire genome
   4. Bar chart – CpG sites
      1. Shows CpG sites in FMRP compares to the average amount per gene

**Conclusion**

1. Conclusion
   1. DNA methylation is extremely important in keeping our genome regulated
   2. BUT it can cause problems
      1. As we age, methylation patterns become more random and can lead to disease
   3. It can lead to parkinsons, alzheimers, epilepsy and many forms of cancer
   4. This is a HUGE area of research, and there are many studies to try to understand why, when, and how genes are targeted for aberrant methylation