**Model Cell Lines**

Choosing the proper cell line for recombinant expression is a necessary challenge all scientists face in strain development. Below an overview of the advantages and disadvantages of some of the popular cell lines used in research and industry today.

1. Mammalian Cells – ex. Chinese Hamster Ovary (CHO)
   1. Advantages
      1. Offers the best post translational modifications for complex proteins
      2. Used in production of some of the most advanced medications in the world
         1. Ex: Antibody X from \_, Recombinant Y from \_, Cancer drug Z from \_
            1. Biopharmaceutials: Antibody Production, Medicines, Vaccines
            2. Foods: Alternative Proteins, Alternative Meats
            3. Industrial: Nanomaterials
   2. Disadvantages
      1. Very prone to contamination – and antibiotic sensitive
      2. Lower passage rates – not immortalized
2. Bacterial cells – ex. *E. coli, Bacillus*, *Cyanobacteria*
   1. Advantages
      1. Extremely fast growing and easy to use
      2. Proven useful to make medications in research as well as manufacturing
         1. Ex: Insulin, Y, Z
            1. Biopharmaceuticals: Medicines, Recombinant Proteins
   2. Disadvantages
      1. Not as good at making complex proteins due to a lack of post translational machinery
3. Insect Cells – ex. SF9
   1. research more, but to my knowledge they are somewhere in the middle of bacteria and mammalian
4. Fungi – ex. *S. cerevisiae* (yeast), filamentous fungi
   1. used in fermentation – when a cell can live with and without oxygen, fermentation is an alternative method of making energy in cells when oxygen is absent. With proper modifications, yeast fermentation can make magnitudes of products.
      1. Foods: Fermented Beverages
      2. Environmental Sciences: Biofuels
5. Algae – ex.
   1. Used for photosynthesis and creation of: Environmental Science – biofuels: Industrial: biomaterials

Applications

1. Biopharmaceuticals
   1. Antibody Production
   2. Medicines
   3. Microbiome
   4. Recombinant Proteins
   5. Viral Production
   6. Vaccines
2. Foods
   1. Alternative Proteins
   2. Artificial Meats
   3. Fermented Beverages
   4. Supplements
3. Environmental Sciences
   1. Agriculture
   2. Biofuels
   3. Bioplastics
   4. Pesticides
4. Industrial Process
   1. Carriers
   2. Biomaterials
   3. Nanomaterials
   4. Preservatives