Epigenetics and Inheritance

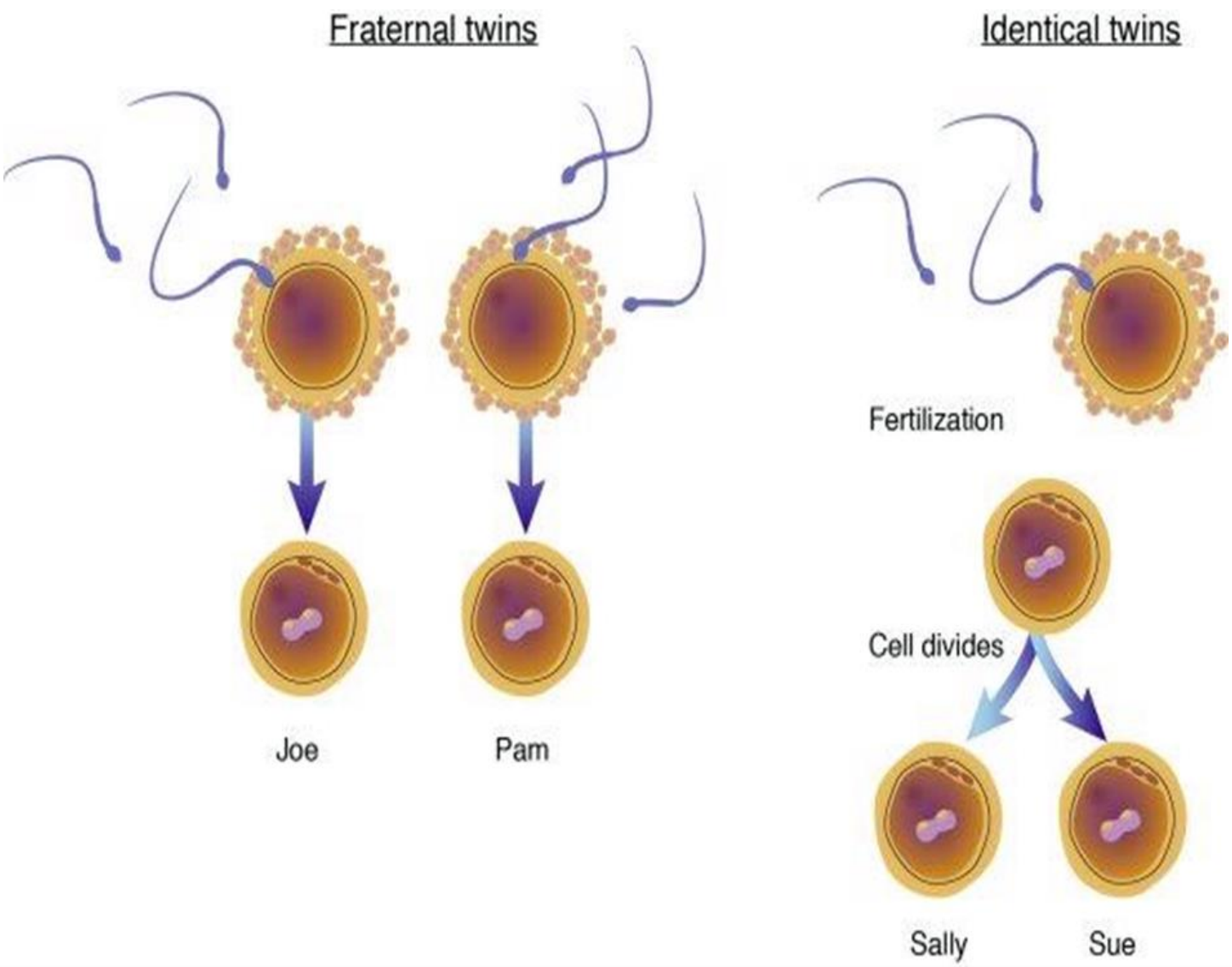
AN EMERGING BASIC FIELD OF SCIENCE AT THE EPICENTER OF MODERN MEDICINE

PART 1

Genetics and Epigenetics

- Identical or monozygotic twins each have the same identical DNA in every cell.
- As monozygotic twins age, however, changes in the phenotype have been observed. Did their DNA change? If not, what else could be happening to cause those changes?
- Now it is becoming clearer that changes in the epigenetics of the individual causes changes in phenotype.

Monozygotic vs Dizygotic Twins



www.genome.gov/dmd/img.cfm?node=Photos/Graphics&id=85188

Monozygotic Twins As Babies Look Identical

https://www.youtube.com/watch?v=waebeotbN9k

Monozygotic Twins as Older Adults Look a Bit Less Identical

http://doublevisionblog.com/

Epigenetics

- Epigenetics is generally defined “as relating to or arising from non-genetic influences on gene expression”.
- *Epi* is the Greek prefix meaning *upon, above, in addition to,* or *near*. The work was coined by Conrad Waddington in the early 1940s to explain “the causal interactions between genes and their products, which bring the phenotype into being”.
- A more current definition is the field of genetics which looks at how genes are variably expressed during the formation of an embryo and during the lifespan of the individual without a change in the DNA sequence.
- Studies have shown that some of these epigenetic changes can be inherited.