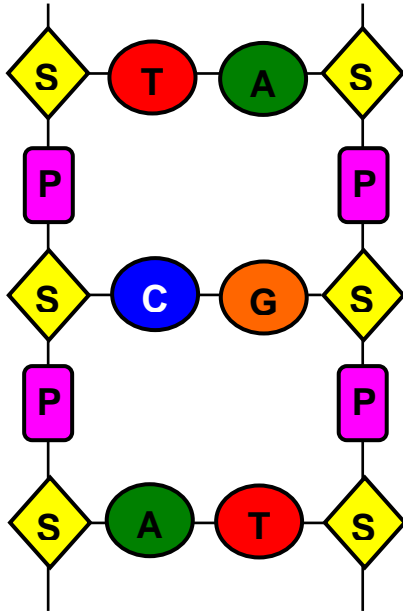


## Lab # 11

### DNA and Electrophoresis



A gene is any given segment along the DNA that encodes instructions that allow a cell to produce a specific product - typically, a protein such as an enzyme.

Sequence Size	Base pairs
Entire yeast genome	15 million
Drosophila genome	180 million
Smallest human chromosome (y)	50 million
Largest human chromosome (#1)	250 million
Entire human genome	3 billion

The average gene size is 3000 bp. The largest known human gene is dystrophin, 2.4 million bp, found on the X chromosome. Dystrophin, a large protein, is required inside muscle cells for structural support

The human genome is estimated to contain 30,000 to 40,000 genes.

Chromosome 1 has the most genes (2968), and the Y chromosome has the fewest (231).

Almost all (99.9%) nucleotide bases are exactly the same in all people.

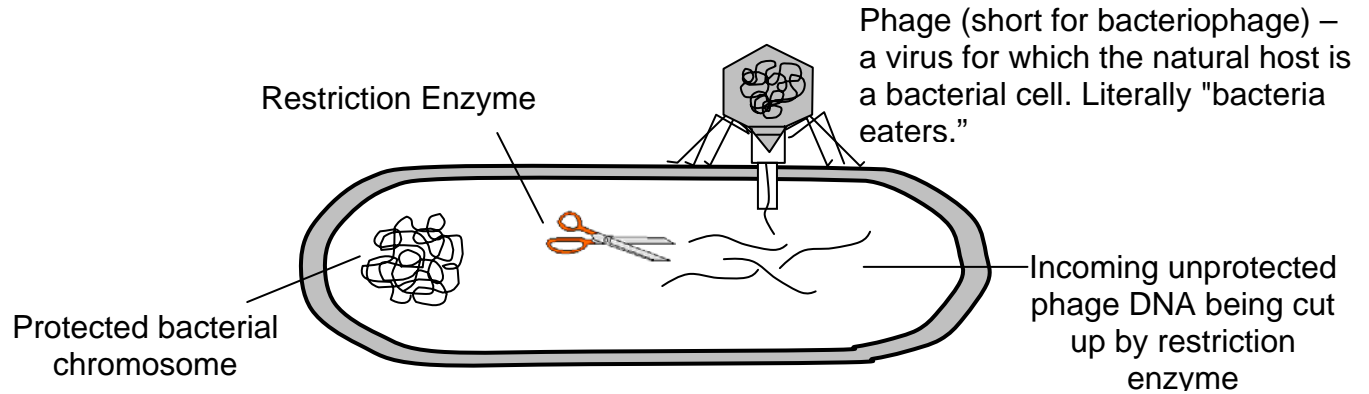
Non-coding repeated sequences ("junk" DNA) make up at least 50% of the human genome.

We are only about 99 percent the same as our closest relatives, chimpanzees.

## RESTRICTION ENZYMES

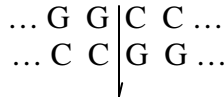
Where did they come from?

Bacteria produce them naturally for protection against bacteriophage infection.



A restriction enzyme recognizes and cuts DNA only at a particular sequence of nucleotides.

HaeIII and AluI cut straight across the double helix producing "blunt" ends.



BamHI and EcoRI cut in such a way that there is an overhanging single strand of DNA at each end of the fragment.



These kinds of fragments are said to have "sticky" ends. Strands with sticky ends and complimentary bases, even from different original pieces of DNA, can be joined together to form recombinant DNA. Imagine the possibilities.

## BASIC ELECTROPHORESIS

		S	S	S
	E	U	U	U
	V	S	S	S
M	I	P	P	P
A	D	E	E	E
R	E	C	C	C
K	N	T	T	T
E	C			
R	E	1	2	3

DNA, cut into pieces with restriction enzyme, is loaded into the wells of the agarose gel.

DNA is negatively charged. When current is applied, the DNA fragments are pulled from the wells towards the positive pole.

Smaller fragments travel faster than the larger ones. The fragments space themselves out according to size.

