

# PROTEIN SYNTHESIS

Information coded in DNA Bases Inside Nucleus

Need to get information out of Nucleus

Protein made by Ribosome In Cytoplasm OUTSIDE Nucleus



**ORIGINAL DNA** CGGATCCAGCCTAGA

**TRANSCRIBED mRNA** |GCC|UAG|GUC|GG|AUC|U|

↳ **URACIL** instead of **Thymine**

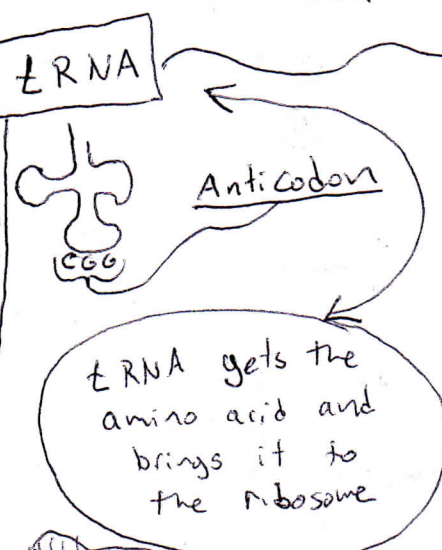
**CODONS** - 3 Bases long

Each codon tells the Ribosome what amino acid goes next.

**TRANSLATED Amino Acid Chain** Ala - STOP - VAL - GLY - SER

USE **CODON CHART** (NOT SHOWN HERE)

Certain codons tell the ribosome when to stop.

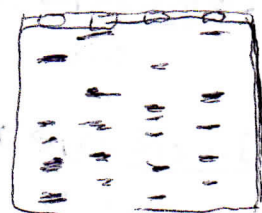


## Biotechnology

**Gel Electrophoresis**  
USE Electrical Current to move fragments of DNA through a gelatin

Small pieces Move Farther  
Large pieces Move closer

DNA Cut into fragments by a **Restriction Enzyme**



USED TO COMPARE TWO OR MORE SAMPLES OF DNA

**Cloning**  
Making an exact genetic copy of an organism

- Nuclear Transfer
- 1 Remove Nucleus from Donor 1 Egg Cell
  - 2 Remove Nucleus from Donor 2 Body Cell (Skin, Blood, etc)
  - 3 Insert Donor 2 Nucleus into Donor 1 Egg
  - 4 Put Egg into host
  - 5 Wait for egg to develop grow & differentiate
  - 6 Host gives birth to clone

OTHER METHODS:  
Plant Clippings  
Mitosis of single cell organisms

**CLONES ARE GENETICALLY IDENTICAL BUT DO NOT look the same because of gene expression**

### Recombination

Take a gene you want and put it into a **Bacterial Plasmid**

USE **RESTRICTION ENZYME** to cut out gene AND cut open plasmid

creates "STICKY ENDS"

Allow gene to join Plasmid

creates circular piece of DNA found in bacteria

