

# PROTEIN

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⟨BIO-TECH 1ST YEAR⟩

# The Building Blocks (The Basics)

- \* What are Proteins? Large, complex molecules that play many critical roles in the body.

- \* The Unit: Made of long chains of Amino Acids (the "monomers").

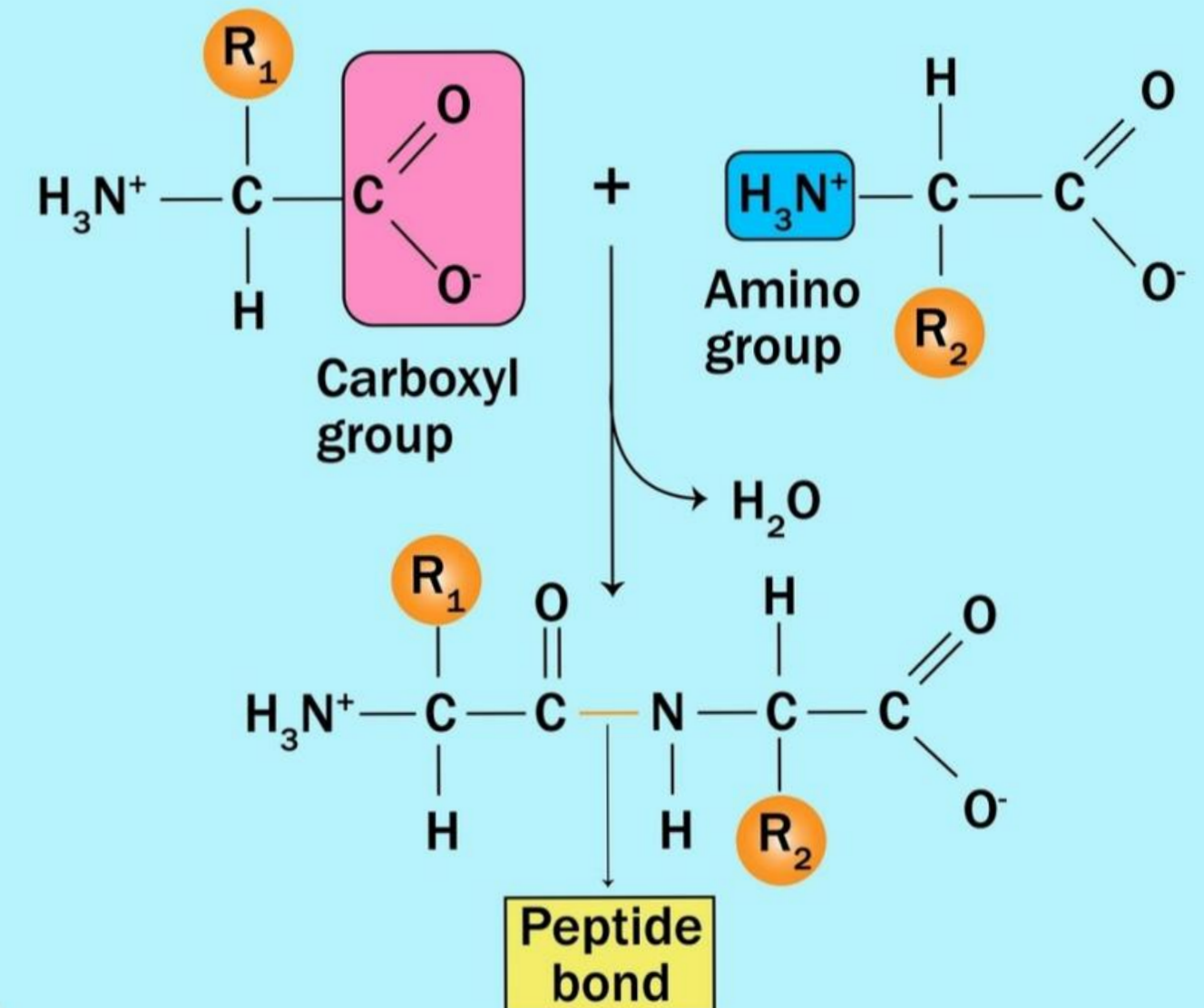
- \* Diversity: There are 20 types of amino acids.

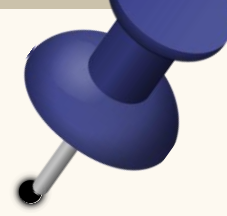
- \* Like the 26 letters of the alphabet, they can create millions of different "words" (proteins).

- \* The Bond: Amino acids are linked together by Peptide Bonds.

- \* Visual:

## PROCESS OF PEPTIDE BOND FORMATION





## THE PROCESS (SYNTHESIS)

# Central Dogma

## Transcription

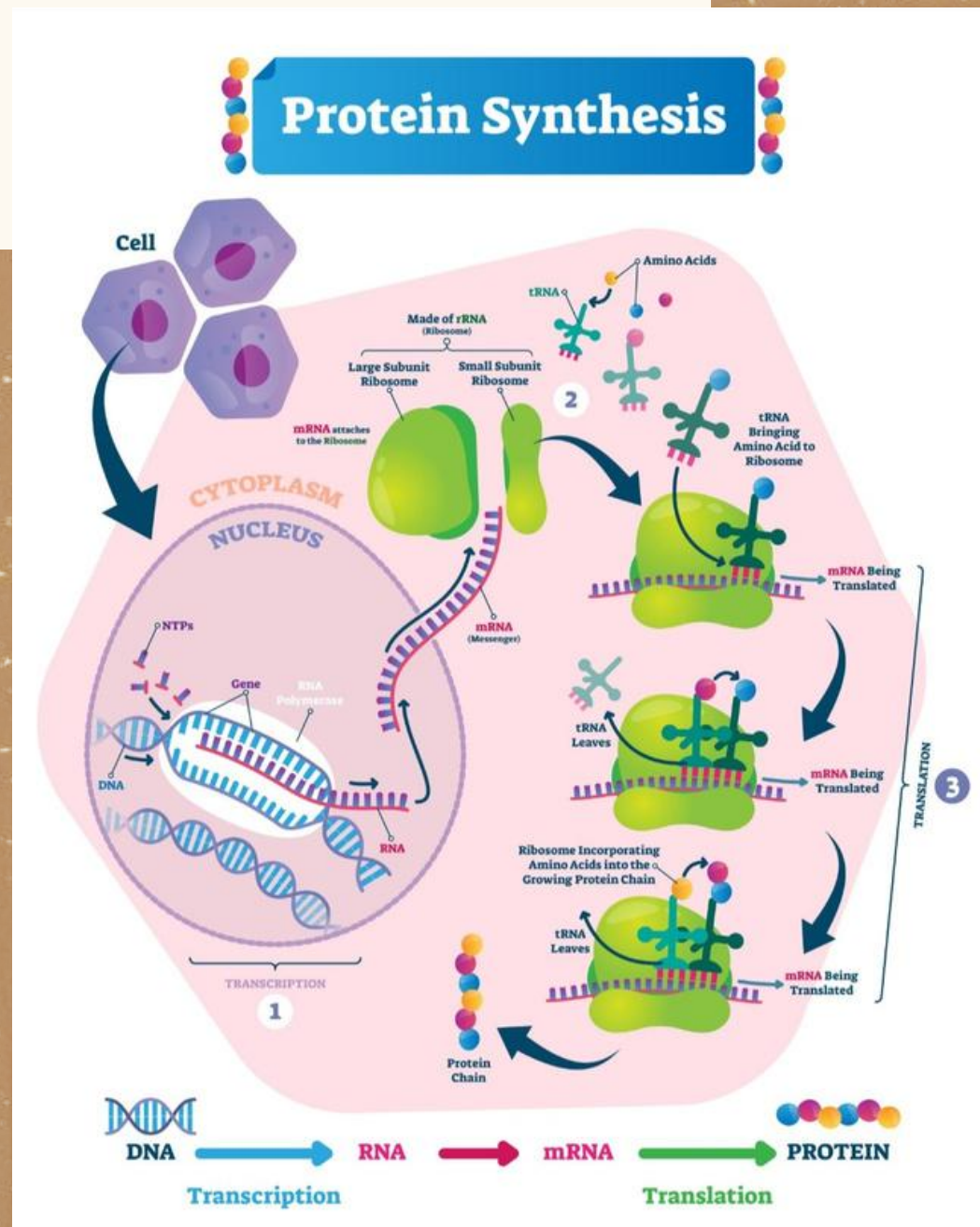
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DNA inside the nucleus acts as the "Master Blueprint." It is copied into mRNA.

**Translation:** The mRNA goes to the Ribosome (the factory).

## Assembly:

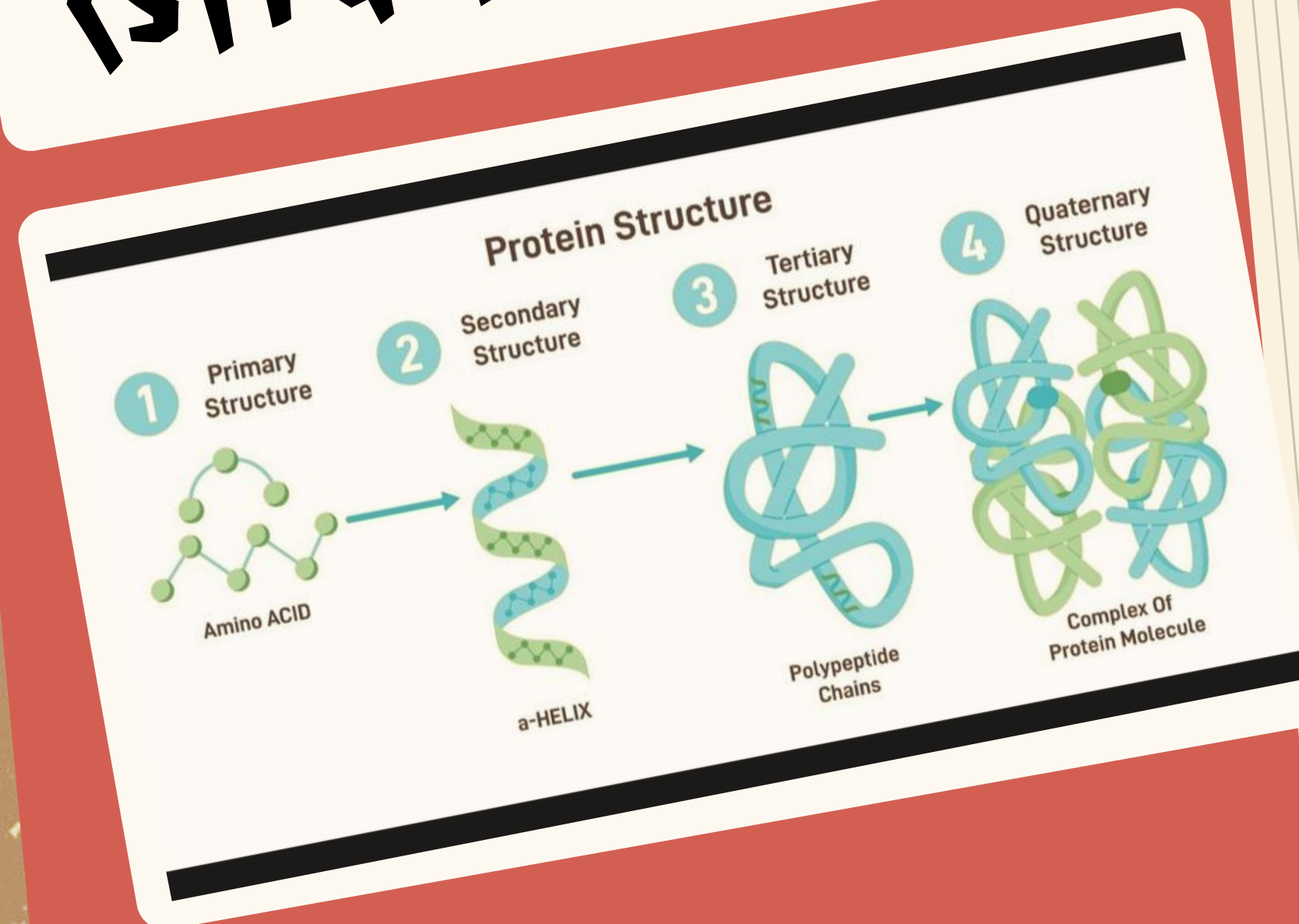
The Ribosome reads the mRNA code and snaps amino acids together in the right order.



A large, textured, reddish-pink sphere is centered on a blue gradient background. The sphere has a fine, grainy texture and a slight shadow on its right side, giving it a three-dimensional appearance. The background is a smooth gradient of blue, darker at the top and lighter at the bottom.

**DNA to Protein**

# The Art of Folding (Structure Levels)



**Primary Structure:** The straight chain of amino acids (The Polypeptide).

\* **Secondary Structure:** The chain starts to twist into spirals (Alpha-helix) or sheets (Beta-sheet).

\* **Tertiary Structure:** The 3D folding creates the final functional shape.

\* **Quaternary Structure:** Multiple folded chains come together (e.g., Hemoglobin).

\* **Key Point:** "Structure determines Function."



# The Disadvantages (Fragility)

\* **Note:** Proteins are powerful, but they are very sensitive

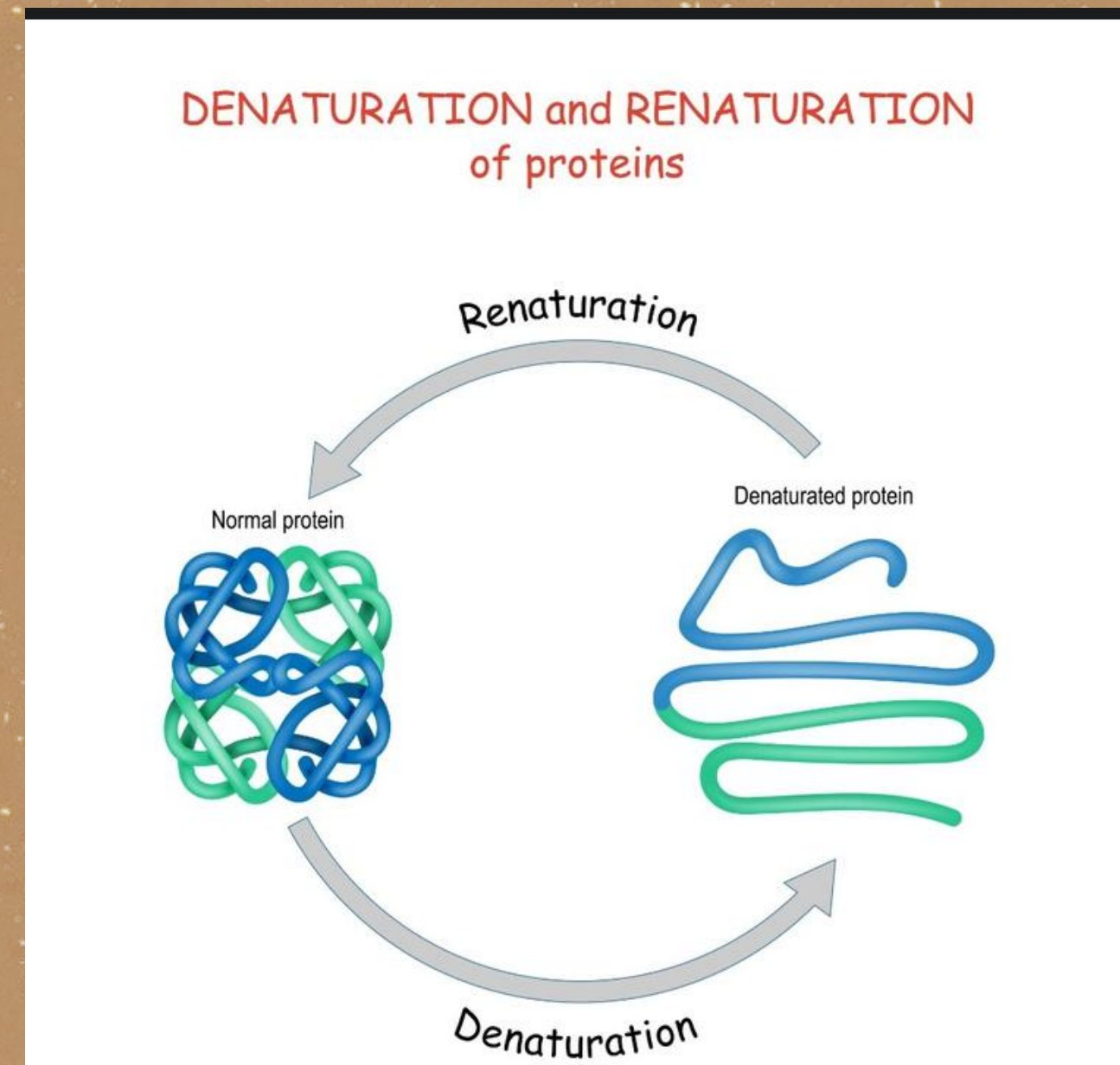
\* **Denaturation:** If the environment changes, the protein unravels and loses function.

\* **Temperature Sensitivity:** High heat destroys proteins (e.g., cooking an egg turns it solid/white).

\* **pH Sensitivity:** Changes in acidity can break the bonds holding the fold together.

\* **Energy Cost:** Making and folding proteins consumes a huge amount of the body's energy (ATP).

\* **Visual:**





# Misfolding

*(when it goes wrong)*

- \* **The Problem:**  
Sometimes  
proteins fold into  
the wrong shape.



# Causes

- \* **Genetic Mutation:** A typo in the DNA code.
- \* **External Stress:** Toxins, heat, or radiation.
- \* **Crowding:** The cell is too crowded, and the protein bumps into others before it is ready.
- \* **Result:** The protein becomes useless or toxic "junk."

# The "Dark Side" **<Diseases>**



- \* **Aggregation:** Misfolded proteins tend to be sticky. They clump together to form Plaques.
- \* **Alzheimer's Disease:** Caused by Amyloid-beta plaques in the brain.
- \* **Parkinson's Disease:** Caused by clumps of alpha-synuclein.
- \* **The Impact:** These clumps kill nerve cells, leading to memory loss and loss of motor control.

# The "Zombie" Protein (Prions)

This is your  
"Curious/Exciting" topic.

## \* **What is a Prion?**

A misfolded protein that  
is infectious.

## \* **How it works:**

-It contains no DNA or RNA. It touches a healthy protein and forces it to misfold, creating a chain reaction (like a Zombie bite).

\* **Examples:** Mad Cow Disease, Creutzfeldt-Jakob Disease (CJD).



## Conclusion

## & The Future

\* **Defense:** Our bodies have Chaperones (helper proteins) that try to fix misfolded proteins.

## \$\_\_Technology and Summary\_\_\$

\* **Technology:** AI like AlphaFold is now predicting protein shapes to help design new drugs.

\* **Summary:** Proteins are the delicate nanobots of life. Understanding their folding is the key to curing deadly diseases.

\* Q&A



**Any  
questions?**

**THE PRESENTATION IS DONE!**



**THANKS FOR YOUR ATTENTION!**



<https://kunal-gupta-1107.github.io/Shiva-Ideas/>