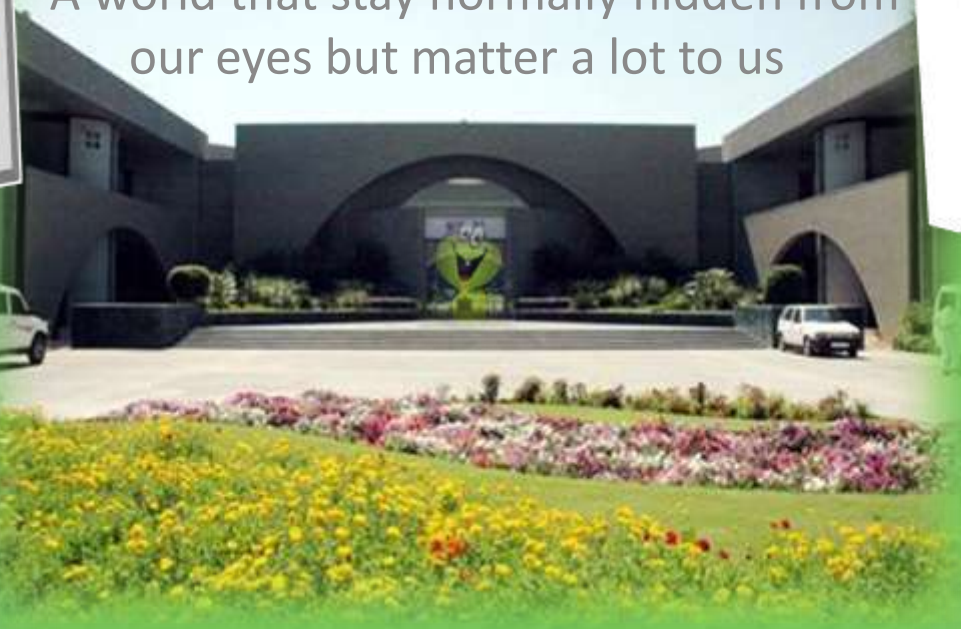
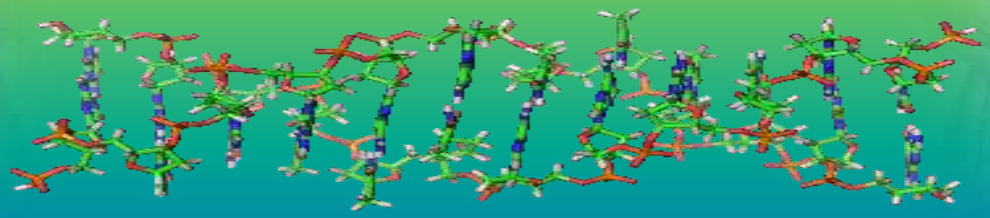
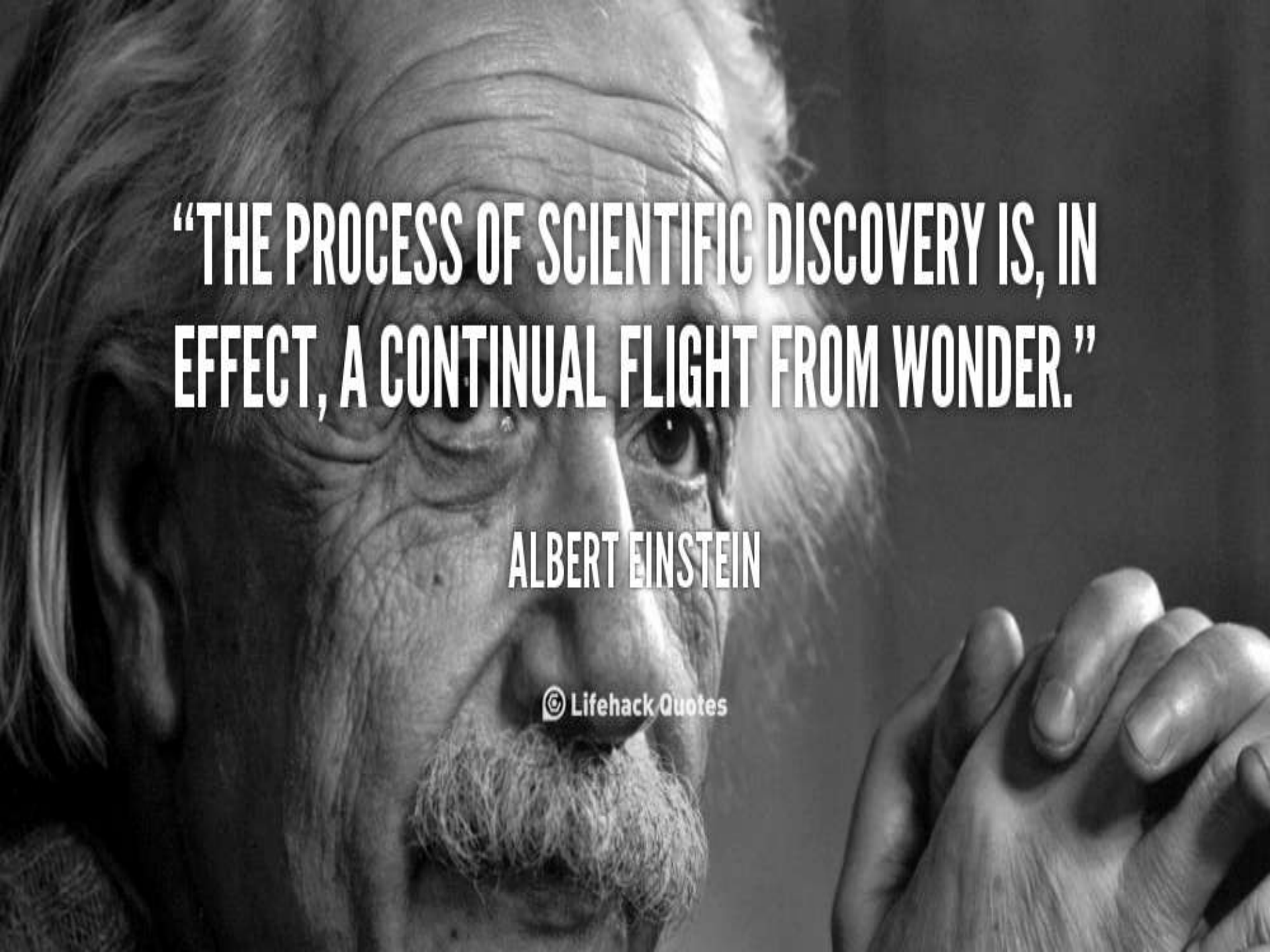
Journey into the cell……

A world that stay normally hidden from our eyes but matter a lot to us

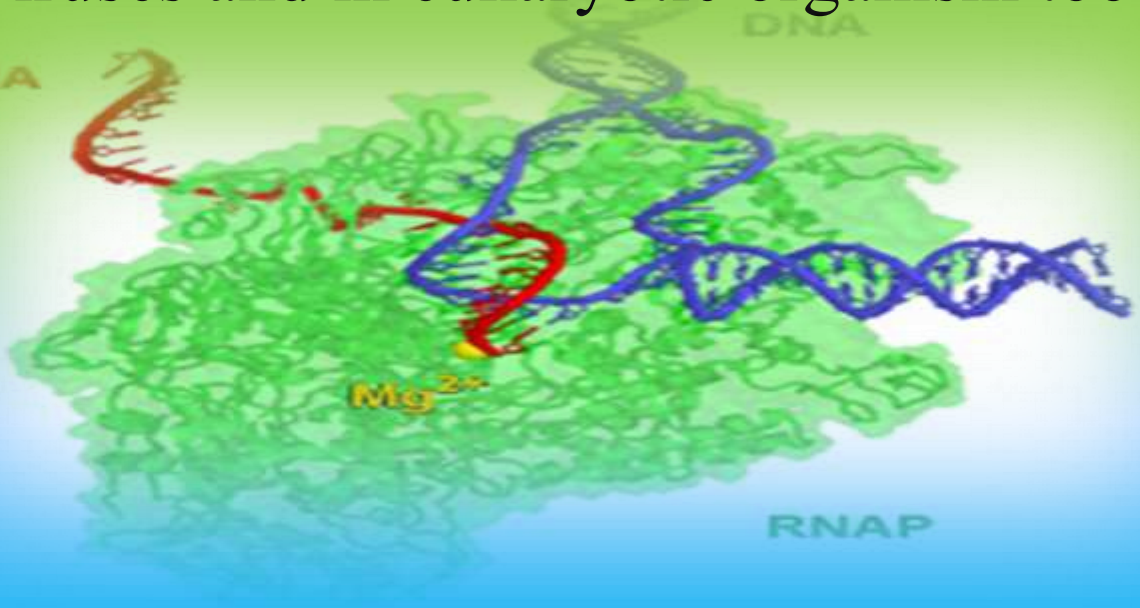





“THE PROCESS OF SCIENTIFIC DISCOVERY IS, IN EFFECT, A CONTINUAL FLIGHT FROM WONDER.”
ALBERT EINSTEIN
Lifehack Quotes

RNA polymerase…..?

RNA polymerase in simple word means an enzymes that produce RNA in the cell these polymerase enzymes is very essential for existence of & moreover found in all organism ranging from bacteria to viruses and in eukaryotic organism too……

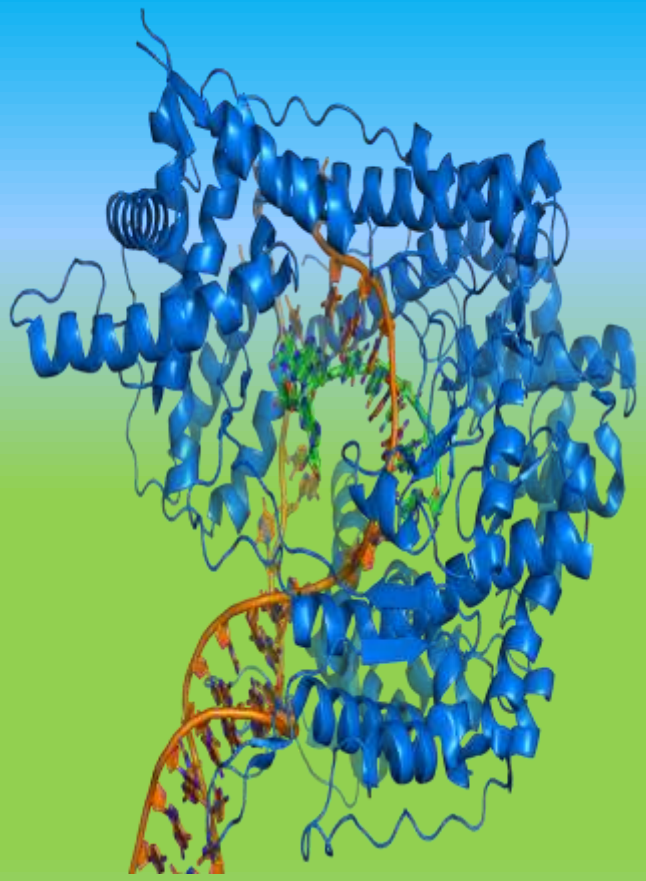


RNA polymerase…..

- It was discovered by samuel b weiss & jerard hurwitz in 1960
- In prokaryotes ,single type of RNA polymerase synthesis all different type of RNA such as m RNA,tRNA & rRNA
- Eukaryotic RNA is multisubunit enzyme made up of five polypeptides-ά,β,ϭώ
- It has molecular mass similar to 465kDa

Product of RNA polymerase

- ✓ **Messenger RNA (mRNA):**template for the synthesis of proteins by ribosomes.
- ✓ **Transfer RNA (tRNA):**transfers specific amino acidsto growing polypeptide chains at the ribosomal site of protein synthesis during translation
- ✓ **Ribosomal RNA (rRNA):**a component of ribosomes
- ✓ **Micro RNA:**regulates gene activity
- ✓ **Catalytic RNA (Ribozyme):**enzymatically active RNA molecules

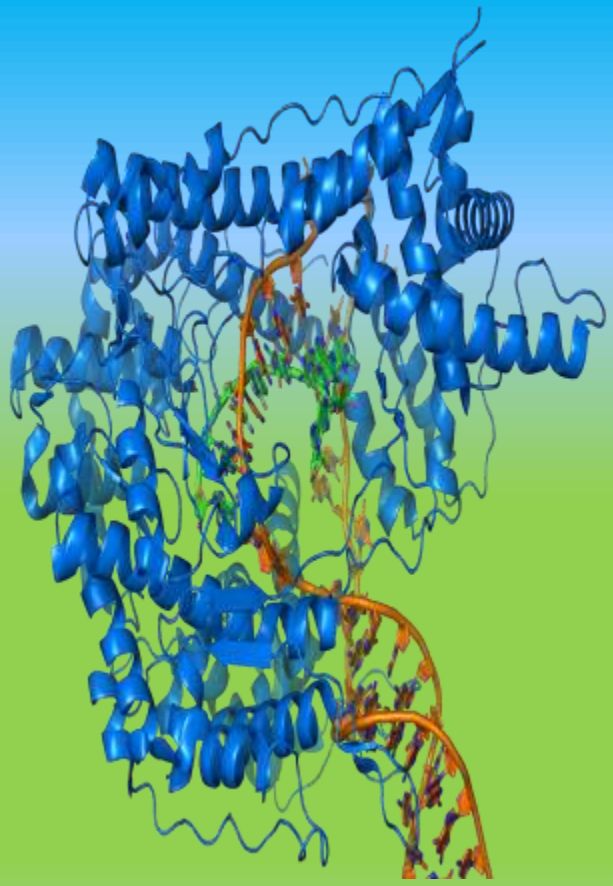


RNA polymerase I

RNA polymerase

RNA polymerase III

RNA polymerase II



RNA Polymerase I

- ✓ it is enzymes that copies DNA To rRNA
- ✓ IT is a type of RNA that almost account for over 50% of RNA synthesis
- ✓ It synthesize RNA for large subunit of ribosomes
- ✓ Molecular mass is of around 500KD
- ✓ The Rate of transcription by it is slower than RNA polymerase II it is only 20 nucleotide
- ✓ Termination by it involves DNA binding protein.
- ✓ TTF1 in mice & REB1P Yeast attach with the DNA at recognized site @ 12-20 downstream of termination point

RNA polymerase II

- ✓ It is an enzyme found in eukaryotic cells. It catalyzes the transcription of DNA to synthesize precursors of mRNA and most snRNA and microRNA.
- ✓ A 550 kDa complex of 12 subunits, RNAP II is the most studied type of RNA polymerase. A wide range of transcription factors are required for it to bind to upstream gene promoters and begin transcription.
- ✓ It has 10-12 subunits(RBP1-12)

RNA Polymerase III

- In eukaryote cells, RNA polymerase III (also called Pol III) transcribes DNA to synthesize ribosomal 5S rRNA, tRNA and other small RNAs. This enzyme complex has a more limited role than the Pol III in prokaryote cells.
- The genes transcribed by RNA Pol III fall in the category of "housekeeping" genes whose expression is required in all cell types and most environmental conditions. Therefore the regulation of Pol III transcription is primarily tied to the regulation of cell growth and the cell cycle, thus requiring fewer regulatory proteins than RNA polymerase II.

In the process of transcription (by any polymerase) there are three main stages:

- **Initiation**: requiring construction of the RNA polymerase complex on the gene's promoter.
- **Elongation**: the synthesis of the RNA transcript.
- **Termination**: the finishing of RNA transcription and disassembly of the RNA polymerase complex.

Cast & crew

- **Speaker**: Ronak Patel,Mayur Mehta,Divyesh Patel & kalpesh Rathod
- **Material accumalation:**Yash Patel,Jay Soni,Shashikant Dubey, Pinakin khambhala,Chirag shrimali,Sameer Qureshi,Ashvin Chaudhary,Binish Joshi Bharat Chaudhary & Manish chauhan
- **Technical designer &coordinator:**Vinay Patel
- **Venue** :Nirma university

Special thanks' to nirma university & Heena mam for giving us this opportunity and platform to represent from science side we all really love science

With regards