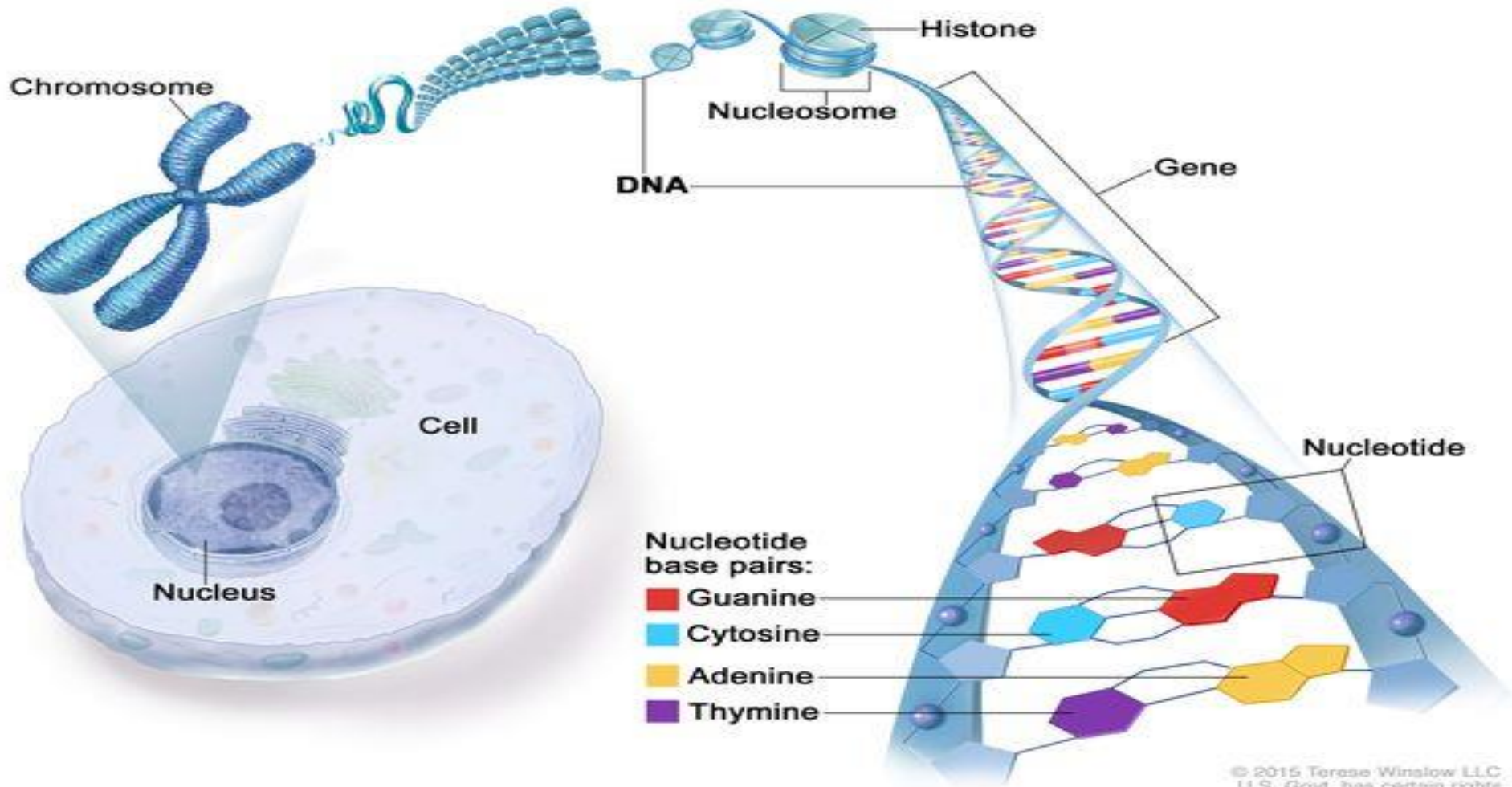


مبانی بیولوژی سلولی و مولکولی، جلسه اول:

DNA، کروماتین، نوکلئوزوم، کروماتوزوم و کروموزوم



DNA Structure



Metaphase chromosome



1400 nm

Condensed scaffold-associated form



700 nm

Extended scaffold-associated form



300 nm

30-nm chromatin fiber of packed nucleosomes



30 nm

"Beads-on-a-string" form of chromatin

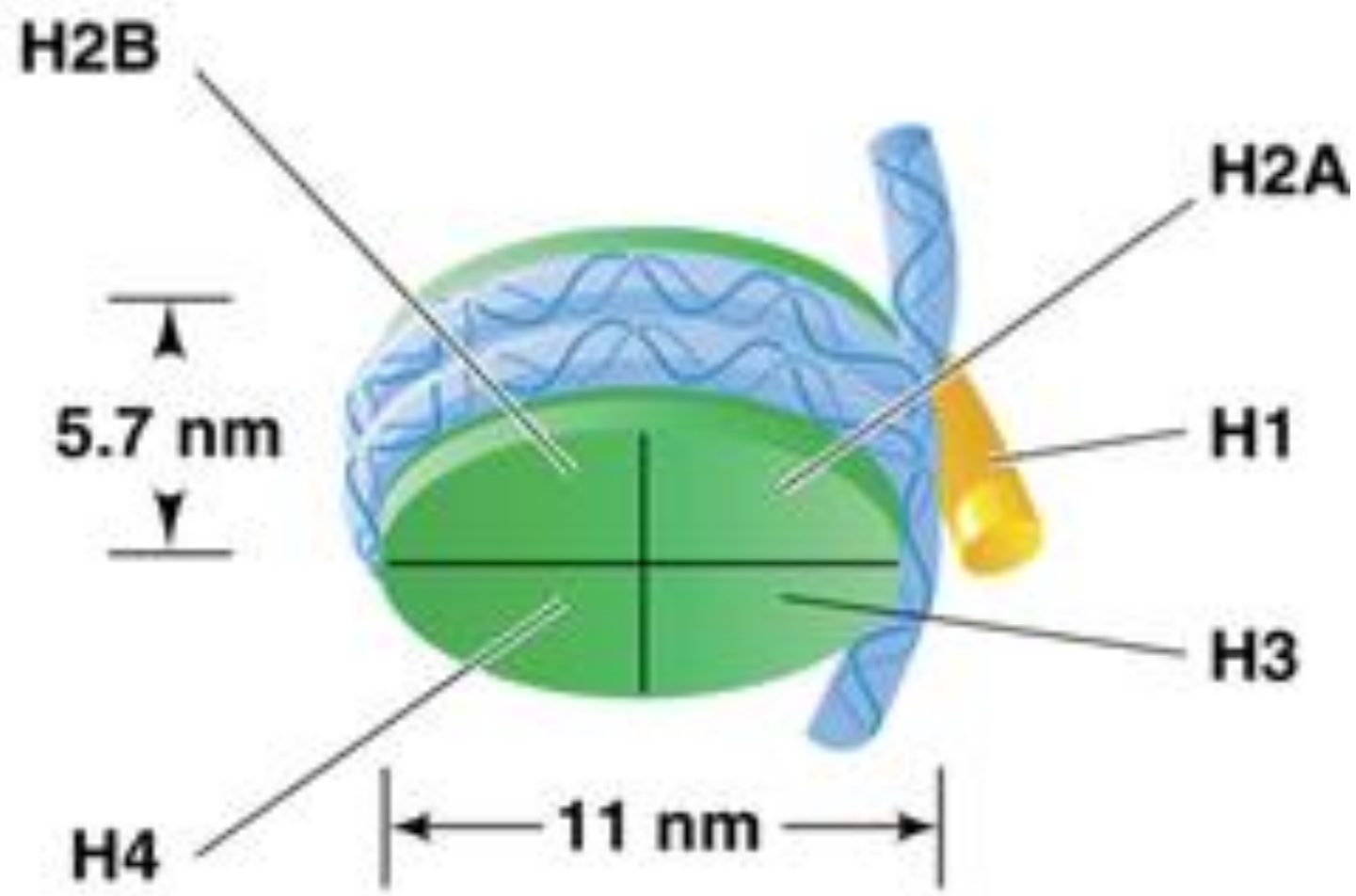


11 nm

Short region of DNA double-helix



2 nm



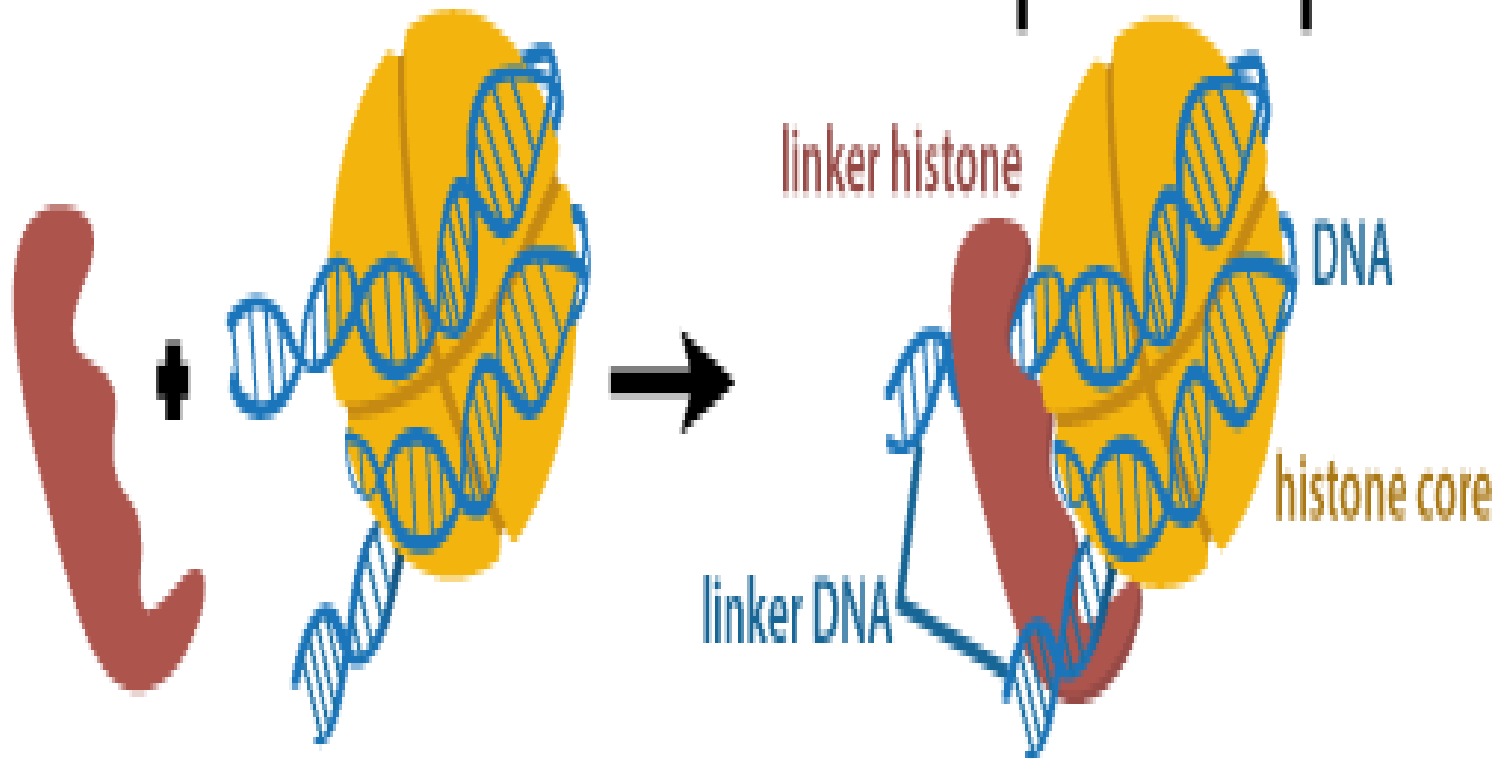
linker histone

nucleosome

chromatosome

(histone core + DNA)

nucleosome



مبانی بیولوژی سلولی و مولکولی، جلسه دوم:

نگرشی بر ژن، بیان ژنتیکی و انواع ژن



DIFFERENT GENE CATEGORIES

Housekeeping genes	Genes turned “on” in all cells at all times (e.g. transcription machinery, translation machinery, energy conversion, etc.).
Cell type specific genes	Genes that are turned “on” in each cell that give a cell its special properties and function.
Developmental regulatory genes	Genes specific to certain stages during growth & development of a person.
Inducible genes	Genes not normally expressed but can be in response to external stimuli (e.g. hormone).

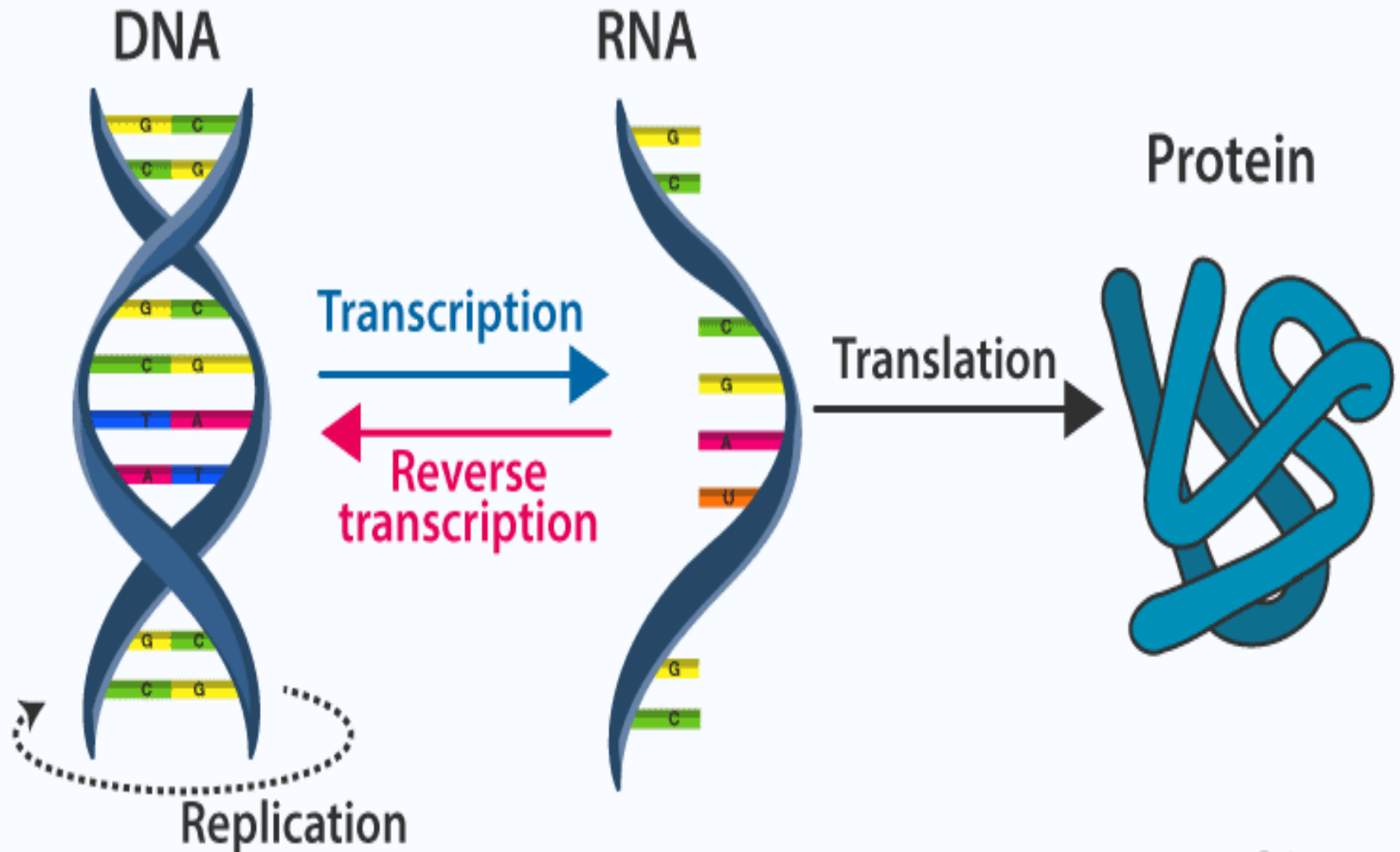
Types of Regulated Genes

- **Constitutive genes** are always expressed
 - Tend to be vital for basic cell functions (often called “housekeeping genes”)
- **Inducible genes** are normally off, but can be turned on when substrate is present
 - Common for **catabolic** enzymes (i.e. for the utilization of particular resources)
- **Repressible genes** are normally on, but can be turned off when the end product is abundant
 - Common for **anabolic** enzymes

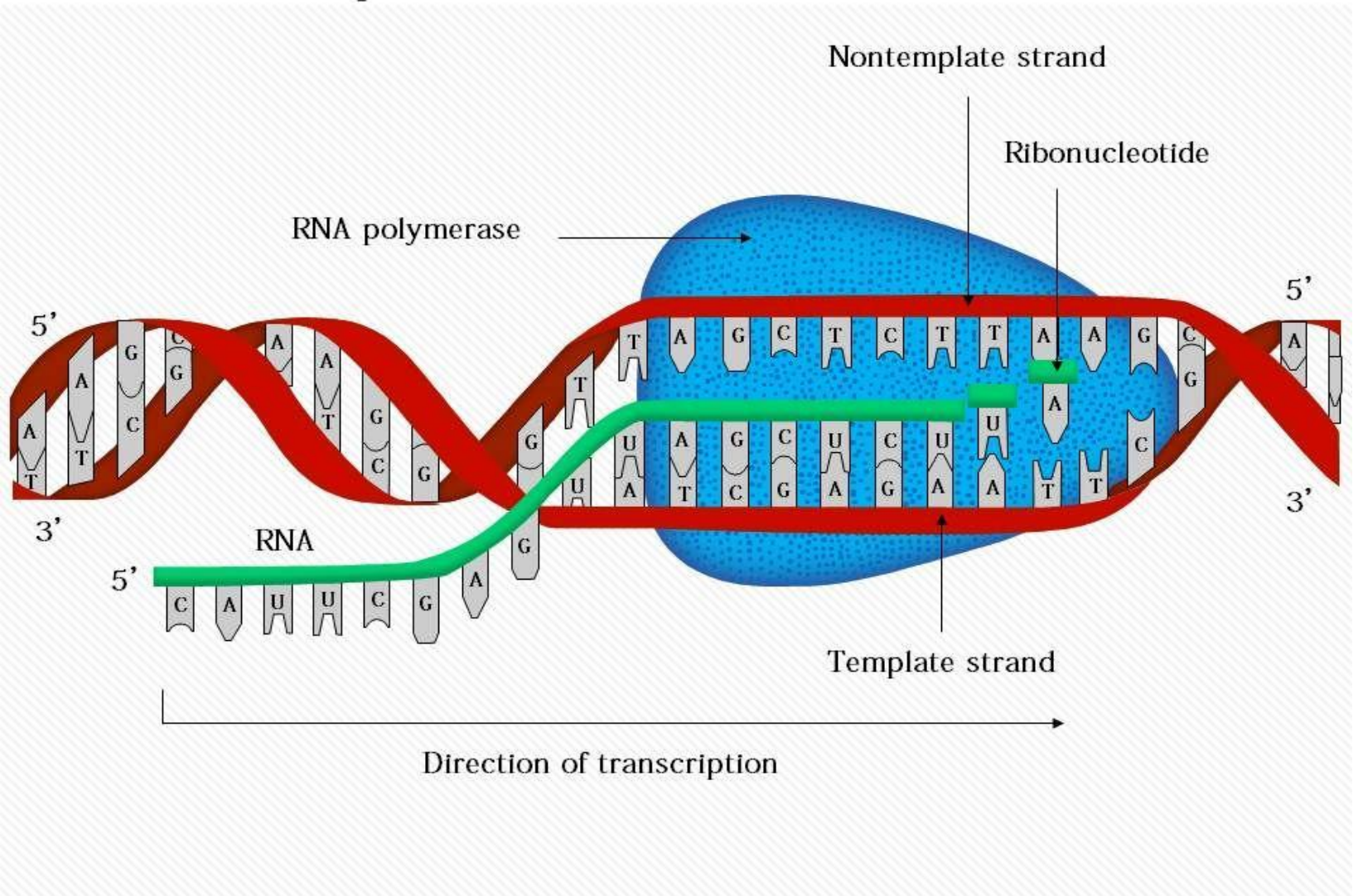
مبانی بیولوژی سلولی و مولکولی، جلسه سوم:

رونویسی، تغییرات پس از رونویسی، ترجمه و تغییرات پس از آن

CENTRAL DOGMA : DNA TO RNA TO PROTEIN

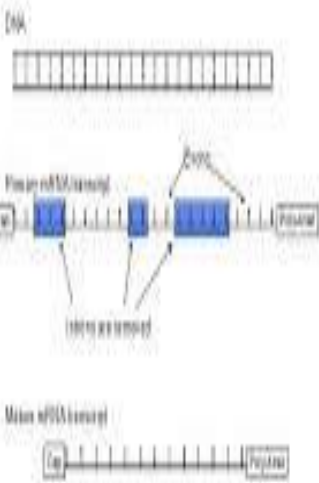


The Transcription Process

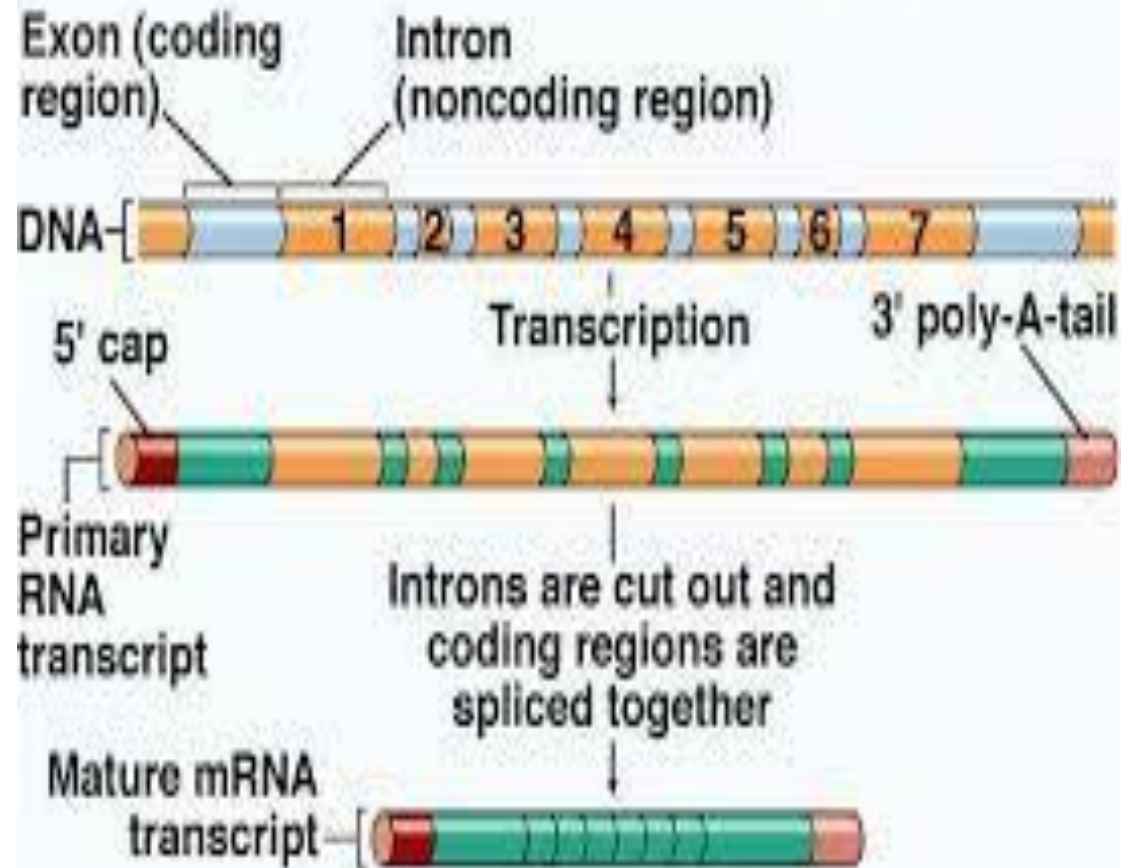


Post-transcription Modifications

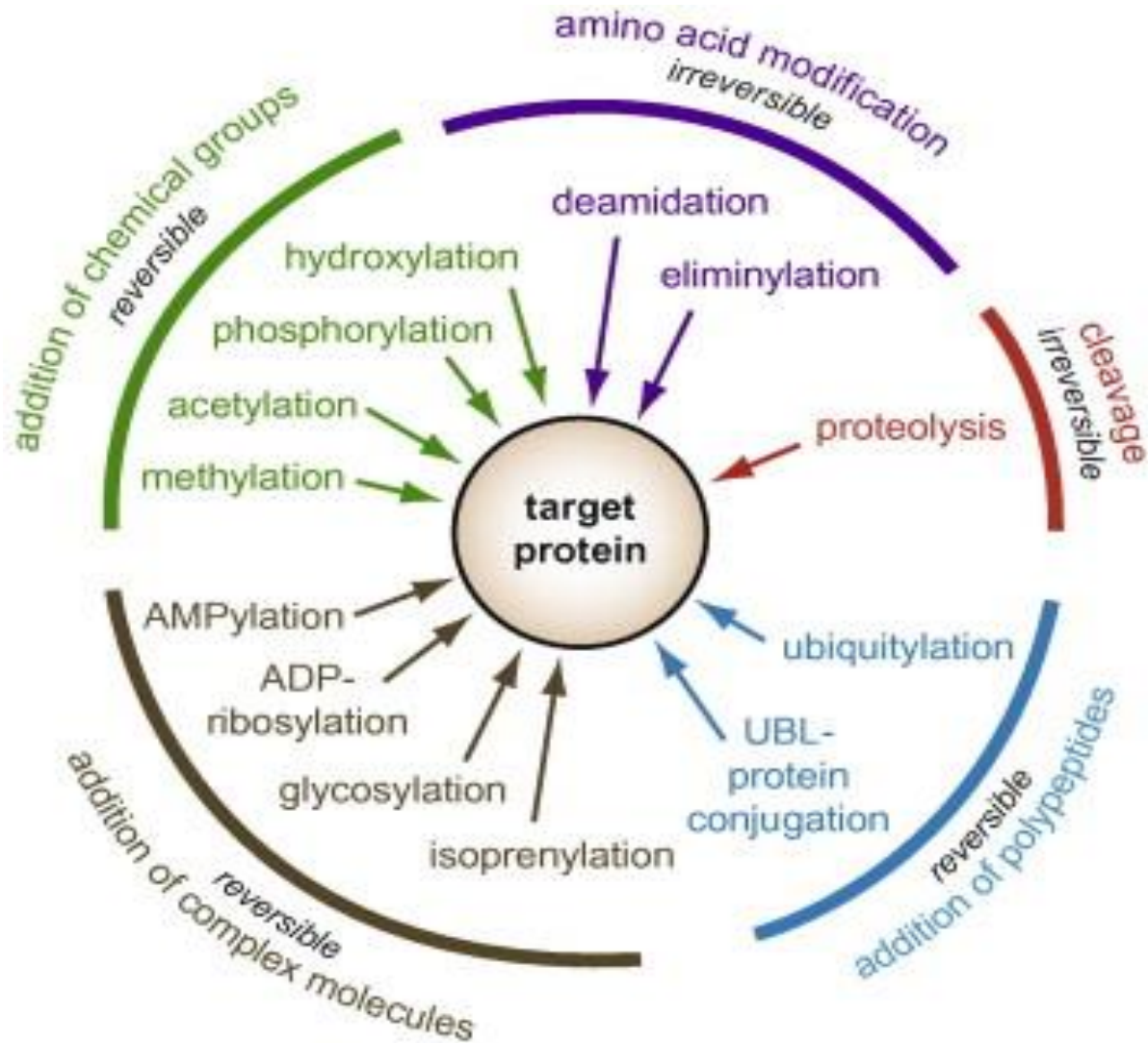
- **Introns and exons** at transcription
- **Introns removed**
- **Exons** are coding pieces for protein synthesis
- **Cap and PolyA tail** are added



Introns and Exons



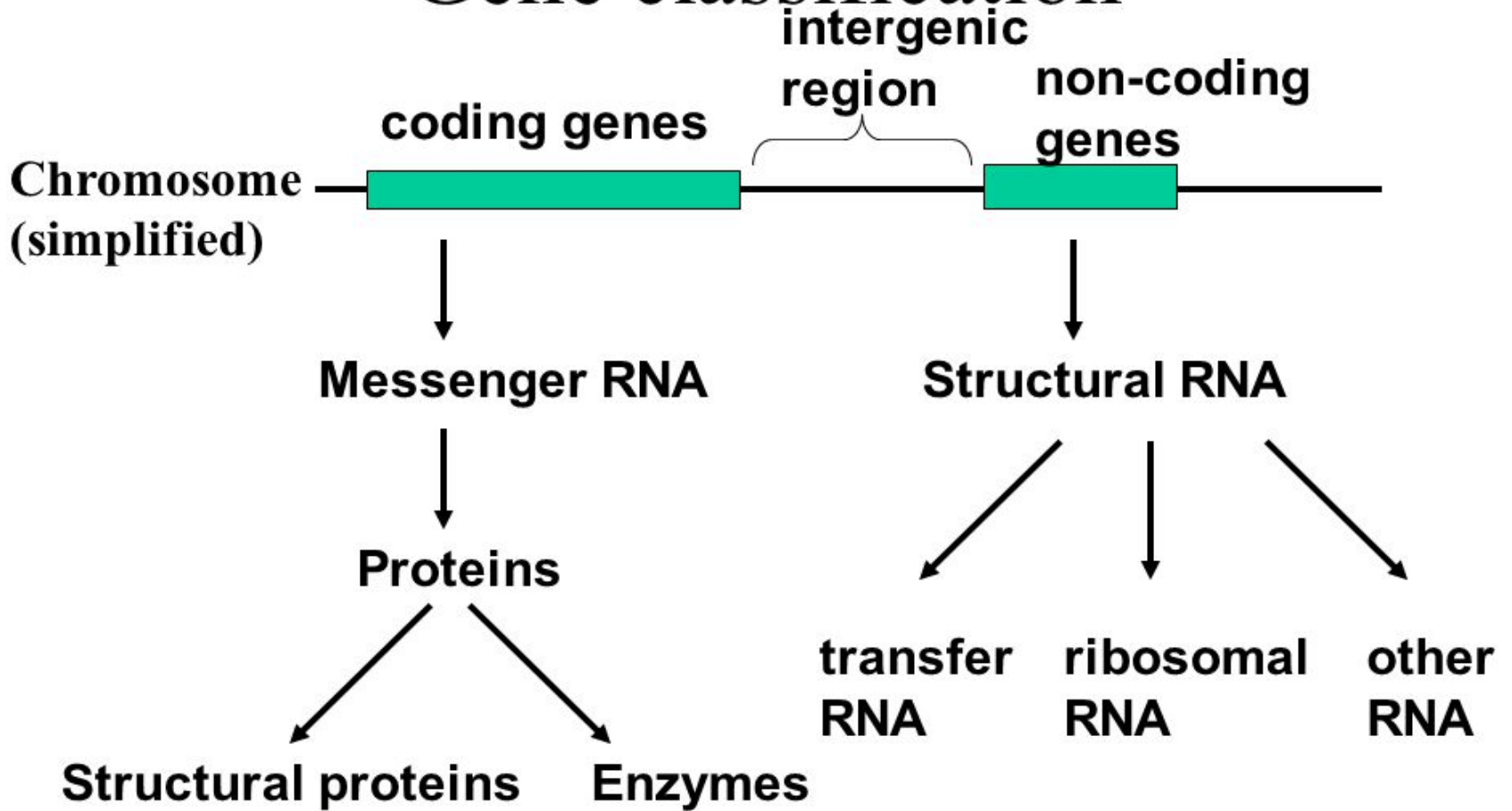
Post translational modifications



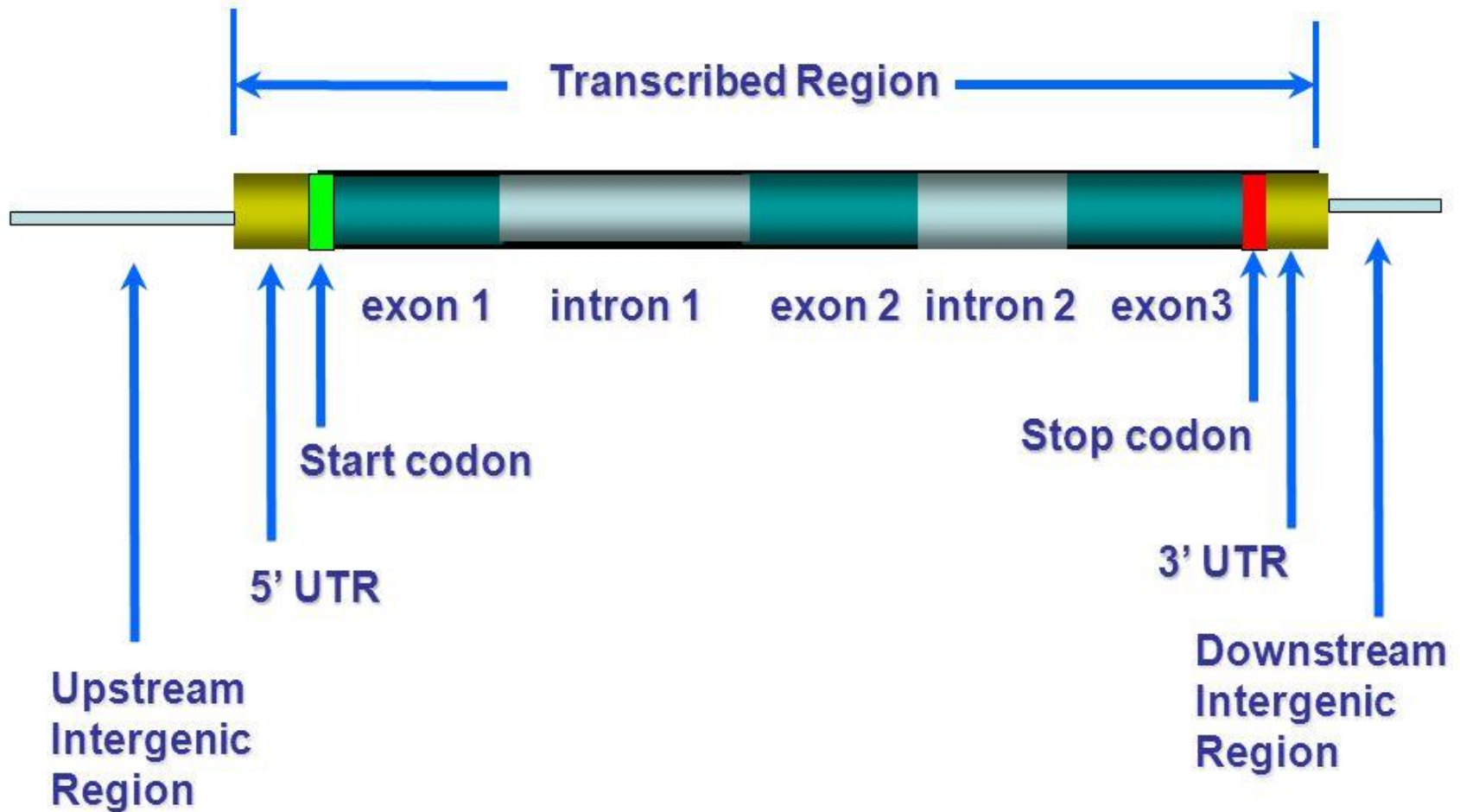
مبانی بیولوژی سلولی و مولکولی، جلسه چهارم

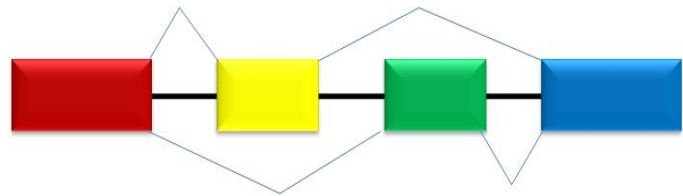
ژن های کد کننده و غیر کدکننده پروتئین، پردازش RNA

Gene classification



Eukaryotic Gene Structure*





pre-mRNA



splicing



alternatively
spliced
mRNAs



translation



protein
isoforms

RNA Processing by Spliceosomes

