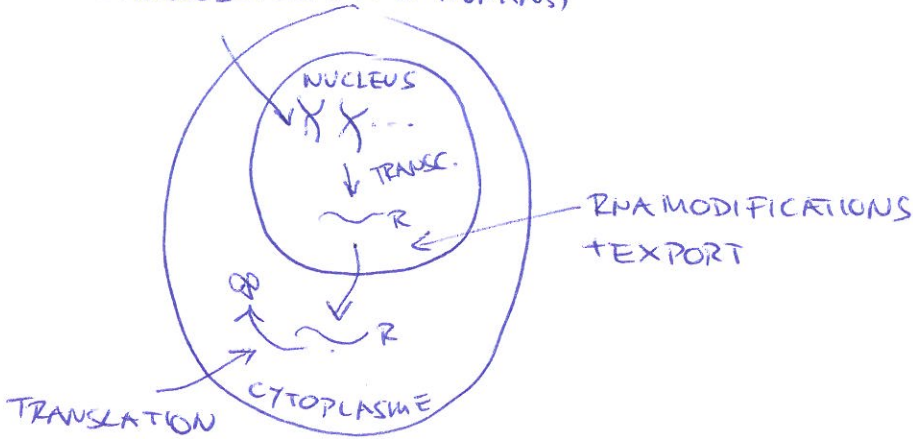


5.3 EUKARYOTIC MICRORNA AND RNAI

EUKARYOTIC CELL

CHROMOSOMES (46 IN HUMANS)



HUMAN GENOME: $2 \times 22 + 2 = 46$ chromosomes (diploid)

LENGTH (HAPLOID): $\sim 3 \cdot 10^9$ bp

GENES: $\sim 20-25K$ (coverage $\sim 2\%$, but 98% transcribed)

(FOR COMPARISON: E. COLI: ~~genome~~ 1 circular genome, $4.6 \cdot 10^6$ bp, ~ 4400 genes, $\sim 95\%$ coverage)

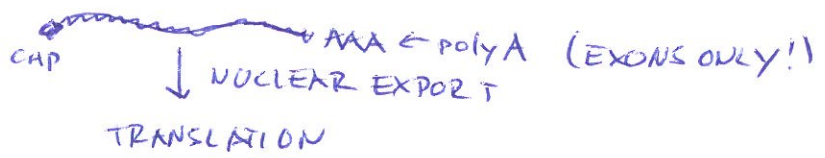
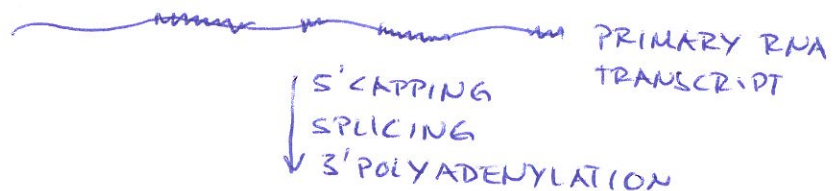
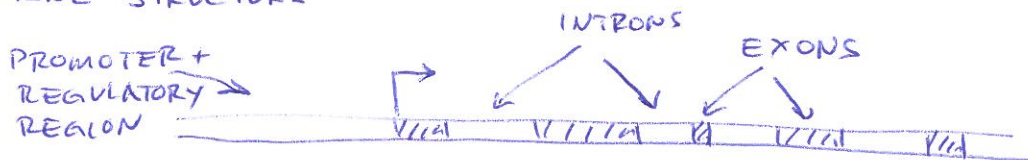
THREE RNA POLYMERASES

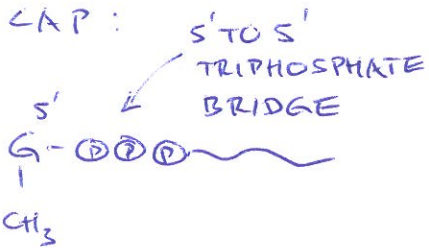
POL I: rRNA TRANSCRIPTION

POL II: mRNA, miRNA

POL III: tRNA, other small RNA

GENE STRUCTURE





SPLICING REMOVES INTRON SEQUENCES (SPliceosome)
 RNA-PROCESSING ENZYMEs GENERATE 3' END

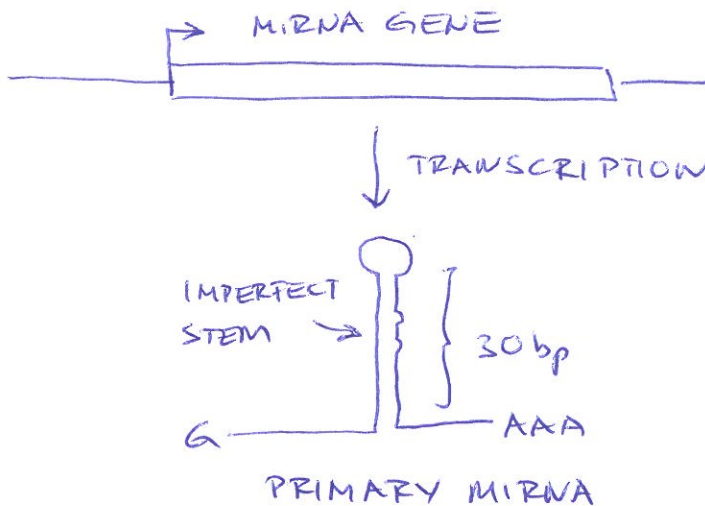
MICRORNA BIOGENESIS

MICRORNA ARE TRANSCRIBED FROM POLII PROMOTERS (CAP + polyA)

~ 1000 miRNA

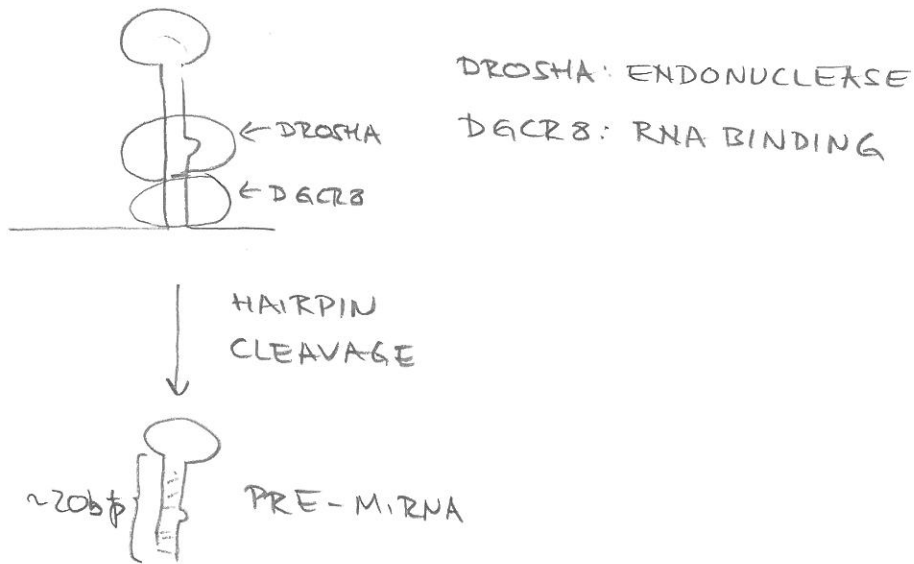
~ INDEPENDENT ~~GEN~~ TRANSCRIPTIONAL UNITS OR INTRONS TO PROTEIN CODING GENES

BASIC CASE

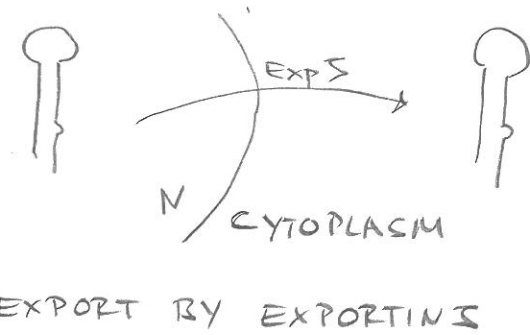


PRIMARY MIRNA: NON-CODING BUT SIMILAR TO mRNA
 CONTAINS IMPERFECT HAIRPIN

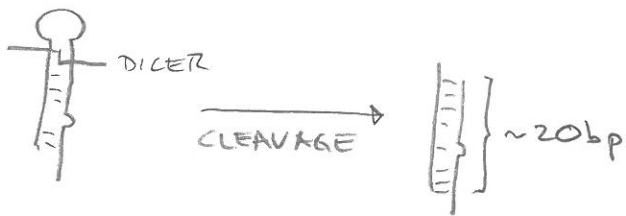
ii) HAIRPIN CLEAVAGE BY DROSHA/DGCR8



iii) PRE-MIRNA EXPORT



iv) DICER CLEAVAGE



DICER: dsRNA ENDONUCLEASE