



KAMARAJ IAS ACADEMY
Only IAS Academy by Grandson of "Perunthalaivar Kamarajar"

Junk DNA (Non-coding DNA)

Published On: 04-11-2025

Definition: “Junk DNA” refers to regions of DNA that do not code for proteins and were once believed to have no biological function.

Key Facts

Percentage in Humans: About 98–99% of the human genome is non-coding DNA.

The term “junk DNA” is misleading — many of these regions have regulatory or structural roles.

Types of Non-coding DNA

Introns: Non-coding sequences within genes removed during mRNA processing.

Regulatory Sequences: Control gene activity – promoters, enhancers, silencers.

Repetitive DNA: Satellite DNA, minisatellites, microsatellites.

Transposons (Jumping Genes): Mobile DNA elements – LINEs, SINEs.

Pseudogenes: Defunct or inactive copies of functional genes.

Evolving Understanding

Earlier thought to be useless; now known to play roles in:

oGene regulation,

oChromatin structure,

oGenome stability.

The ENCODE Project (2012) found that a significant portion of “junk DNA” is biochemically active.

Functions Identified

Regulating gene expression (turning genes on/off).

Maintaining chromosomal structure.

Producing non-coding RNAs (microRNAs, lncRNAs) that control other genes.

Providing evolutionary raw material for genetic variation and innovation.\

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