

WHY IT MATTERS?

Extrachromosomal DNA (ecDNA) are circular, gene-containing DNA particles in cancer cells that exist outside chromosomes. They inherit genes through random segregation, creating variability. Their open structure enables high gene expression. ecDNA can form hubs, where regulatory elements interact, enhancing transcription. Detection is difficult as they often resemble fragmented DNA.

Extrachromosomal DNA introduces a level of variability and gene expression in cancer cells that is difficult to control using conventional approaches. Its presence is associated with more advanced stages of cancer, increased metastasis, and lower overall survival. Detection remains challenging due to its structural differences, and current treatments may unintentionally increase its prevalence. The diversity of ecDNA across cancers further complicates efforts to develop universal treatment strategies.

ecDNA might be the reason cancer adapts, grows and metastatizes. Addressing ecDNA may be key to overcoming some of the most persistent challenges in cancer treatment.