

Extrachromosomal DNA: New players in oncology



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DNA that is found outside the main chromosomes in a cell's nucleus is known as extrachromosomal DNA (ecDNA).¹ This type of DNA is not part of the standard 23 pairs of chromosomes in humans and instead exists as standalone circular or linear DNA structures. Unlike bacterial plasmids, ecDNA in human cells contains important genetic material and holds particular significance in cancer cells. Critical characteristics of ecDNA in Cancer are that they frequently harbor amplified versions of oncogenes such as MYC, EGFR, and CCND1.² These oncogenes propel the growth and survival of tumors.³ Cancer cells utilize ecDNA to generate multiple copies of these oncogenes, amplifying their expression without requiring alterations to the chromosomal structure.⁴ This amplification grants the cancer cells a competitive edge in growth. ecDNA plays a crucial role in the advancement and growth of cancer, as it amplifies oncogenes, genetic diversity, and resistance to treatments.⁵ Its adaptable and ever-changing characteristics empower cancer cells to adjust to external influences such as medication. Gaining insights into ecDNA's operations and impacts could lead to new possibilities for diagnosing and treating cancer, as well as developing therapies aimed at this distinct DNA structure.

Ruby Dhar¹, Arun Kumar², Subhradip Karmakar³

¹Scientist, Room 3020, ³Additional Professor, Department of Biochemistry, All India Institute of Medical Sciences, New Delhi, ²Professor, Department of Biochemistry, Narayan Medical College, Gopal Narayan Singh University, Sasaram, Bihar, India

Address for Correspondence:

Dr. Subhradip Karmakar, Additional Professor, Department of Biochemistry, All India Institute of Medical Sciences, New Delhi, India. **Mobile:** +91-9999612564.

E-mail: subhradipaiims@gmail.com

Dr. Arun Kumar, Professor, Department of Biochemistry, Narayan Medical College, Gopal Narayan Singh University, Sasaram, Bihar, India. **Mobile:** +91-7584089886.

E-mail: profdrarunk@gnsu.ac.in

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Authors Contributions:

RD, AK and SK- Contributed equally toward scripting of this editorial.

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Department of Biochemistry, All India Institute of Medical Sciences, New Delhi, India and Department of Biochemistry, Narayan Medical College, Gopal Narayan Singh University, Sasaram, Bihar, India.

Orcid ID:

Dr. Ruby Dhar - <https://orcid.org/0000-0003-3600-6554>

Dr. Arun Kumar - <https://orcid.org/0000-0002-8800-0296>

Dr. Subhradip Karmakar - <https://orcid.org/0000-0002-4757-8729>

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