

Editorial

Cancer and Genetics: Unlocking the Code of Disease

 Huseyin Erdal

Department of Medical Genetics, Aksaray University Faculty of Medicine, Aksaray, Türkiye

Cancer remains one of the most formidable challenges in modern medicine, a disease characterized by uncontrolled cell growth and the ability to invade other tissues. While environmental factors such as smoking, diet, and radiation exposure contribute to cancer risk, genetics plays a pivotal role in its onset and progression. Understanding the genetic basis of cancer has revolutionized both diagnostics and treatment strategies, offering new hope for targeted therapies and personalized medicine.

At the core of cancer genetics are mutations—changes in DNA that disrupt normal cellular functions. Some mutations occur spontaneously, while others are inherited, increasing an individual's susceptibility to certain cancers. For example, mutations in the BRCA1 and BRCA2 genes significantly raise the risk of breast and ovarian cancers. Similarly, Lynch syndrome, caused by mutations in mismatch repair genes, predisposes individuals to colorectal and other cancers. These discoveries have led to the development of genetic screening programs that enable early detection and preventive measures for high-risk individuals.

Beyond hereditary mutations, cancer often arises from acquired genetic changes due to environmental exposures or aging. The advent of next-generation sequencing has allowed scientists to map cancer genomes, identifying driver mutations responsible for tumorigenesis. This knowledge has fueled the development of targeted therapies, such as tyrosine kinase inhibitors for lung cancer with EGFR mutations and immune checkpoint inhibitors tailored to tumors with high mutational burdens. Despite these advances, challenges remain. Tumor heterogeneity, the presence of diverse cancer cell populations within a single tumor, complicates treatment. Additionally, resistance to targeted therapies can develop as cancer cells adapt and acquire new mutations. Ongoing research into gene-editing technologies like CRISPR and RNA-based therapies holds promise for overcoming these hurdles and refining precision oncology.

The intersection of cancer and genetics underscores the necessity for continued research, interdisciplinary collaboration, and ethical considerations in genetic testing. As we unravel the genetic complexities of cancer, we move closer to more effective, personalized treatments and, ultimately, improved patient outcomes.

With warm regards,

Editor-in-Chief



Cite this article as:

Erdal H. Cancer and Genetics:
Unlocking the Code of Disease.
Adv Health Sports Technol Sci
2025;2(1):1.

Address for correspondence:

Huseyin Erdal.
Department of Medical
Genetics, Aksaray University
Faculty of Medicine, Aksaray,
Türkiye
E-mail: herdalyfa@gmail.com

Available Online: 27.03.2025

Advances in Health, Sports and
Technology Sciences – Available
online at www.advanceshsts.com



This work is licensed under
a Creative Commons
Attribution-NonCommercial
4.0 International License.