Chapter 2
Cervical Cancer Exposomics and the Impact of Environmental and Lifestyle Factors on Carcinogenesis

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ABSTRACT

Cervical cancer remains a significant public health concern, particularly in low- and middle-income countries. While human papillomavirus (HPV) infection is a well-established primary cause, emerging research highlights the role of environmental

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exposures, lifestyle factors, and socioeconomic conditions in modulating carcinogenesis. This chapter explores the concept of cancer exposomics in the context of cervical cancer, emphasizing the cumulative impact of chemical pollutants, dietary habits, occupational hazards, and lifestyle factors on disease progression. The interplay between HPV infection, environmental toxins (such as endocrine disruptors and heavy metals), and immune system modulation is discussed. Additionally, the chapter highlights the significance of early screening, vaccination, and personalized interventions in mitigating the risk. By integrating exposomic research with molecular epidemiology, this study provides insights into novel preventive and therapeutic strategies for cervical cancer management.

INTRODUCTION TO CANCER EXPOSOMICS

Exposomics is the field of studying the impact of environmental factors in the formation of cancer. Air pollution, chemical additives, and eating habits that are exposed to a lifetime can cause biological changes. By examining these changes, the initial diagnosis and prevention of cancer can be improved. Cancer Exposomics is a pioneering sector that combines many fields such as medicine, biology, and quality analysis. Priyadarshini et al. (2023) conducted a study where they discovered that in patients undergoing chemotherapy and radiotherapy, dying cancer cells release chromosomal fragments. These fragments travel through the bloodstream and may cause cancer to grow in new locations. This finding provides a new perspective on metastasis (the spread of cancer). This discovery could lead to new research aimed at preventing cancer recurrence. Goyal et al. (2022) highlighted that CAR-T Therapy represents a significant advancement in cancer treatment. In this approach, a patient's immune cells are modified and this therapy more affordable in India, reducing side effects and increasing its effectiveness.

Cancer is a condition where cells proliferate uncontrollably in the human body. It can manifest in various forms and can be caused by numerous environmental and lifestyle factors. A major field that studies the root causes of cancer is exposomics by Wild et al. (2013). Ren et al. (2011) encompasses all external influences one faces throughout their lifetime as air pollution, chemicals, dietary habits, lifestyle practices, etc. Exposomics is a field that examines how environmental impacts affect the human body, apart from genetic information. It is a modern discipline that has emerged from recent research developments. Through exposomics, it becomes possible to foresee the likelihood of an individual developing any type of cancer. This helps protect an individual's health., Bhowmik et al. (2015) exposomics studies, it is possible to identify the environmental impacts leading to cancer in advance and devise ways to avoid them. This opens new avenues in disease prevention. Further-