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Review

A Comprehensive Review of Various Therapeutic Strategies for the Management of Skin Cancer

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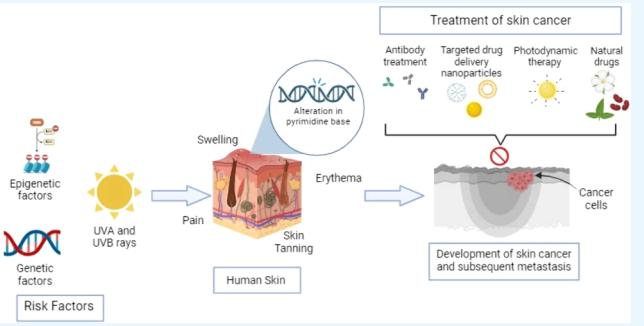
ABSTRACT: Skin cancer (SC) poses a global threat to the healthcare system and is expected to increase significantly over the next two decades if not diagnosed at an early stage. Early diagnosis is crucial for successful treatment, as the disease becomes more challenging to cure as it progresses. However, identifying new drugs, achieving clinical success, and overcoming drug resistance remain significant challenges. To overcome these obstacles and provide effective treatment, it is crucial to understand the causes of skin cancer, how cells grow and divide, factors that affect cell growth, and how drug resistance occurs. In this review, we have explained various therapeutic approaches for SC treatment via ligands, targeted photosensitizers, natural and synthetic drugs for the treatment of SC, an epigenetic approach for management of melanoma, photodynamic therapy, and targeted therapy for BRAF-mutated melanoma. This article also provides a detailed summary of the various natural drugs that are effective in managing melanoma and reducing the occurrence of skin cancer at early stages and focuses on the current status and future prospects of various therapies available for the management of skin cancer.



1. INTRODUCTION

Cancer is characterized by deregulated cell growth comprising different disease groups.[1] It originates from a combination of epigenetic and genetic abnormality that leads to the turn-off of anti-oncogenes and the switch-on of oncogenes/proto-oncogenes.[2] There were 19.3 million new cases of cancer globally in 2020 and about 10 million cancer-related deaths occur yearly.[3,4] Globally, skin cancer (SC) is the fastest-growing cancer type, which is characterized by an aggressive, persistent, multifaceted cancer.[5,6] The various kinds of skin tumors have been designated following the cells from which they develop, with squamous cell carcinoma (SCC) and cutaneous melanoma (CM) as well as basal cell carcinoma (BCC) among the most prevalent and well-characterized.[7] A majority of cutaneous tumors (around 90%) are nonmelanoma skin cancer (NMSC).[8] When therapy is insufficient or slowed down, NMSC may be locally damaging even though they are typically treatable and seldom lead to mortality or advanced stages. On the other hand, CM, which comprises nearly one percent of skin tumors that pose the greatest risk of mortality, is responsible for 90% of skin-tumor-related fatalities.[9]

Epidermal cells are the main cause of NMSC, which exhibits typical epidemiology (for example, a higher incidence in Caucasian people). On the other hand, MCC, which is hypothesized to result from Merkel cells, is more common in equatorial regions and is more common in people of white ancestry.[10] Although there are several factors involved in the pathogenesis of BCC, SCC, and MCC, exposure of the skin to environmental cancer-causing agents is the most common cause of risk. Progenitor cells may immediately undergo a cancerous change due to ultraviolet radiation (UVR).[11−13] Other risk factors for the growth of BCC and SCC involve co-occurring illnesses and therapies (such as psoriasis), repeated contact with the human papillomavirus, drug-induced suppression of immunity in patients with transplants, and specific medications for the management of various kinds of cancer (particularly melanoma).[14−16] The growth of NMSC is favorably influenced by poor socioeconomic and demographic positions, as shown by numerous research.[17,18] A frequent occurrence in MCC is the inclusion of the Merkel cell polyomavirus (MCP-yV) inside the genome of tumor cells. In recent years, the molecular characteristics underlying the MCP-yV-induced cancerous alterations in Merkel cells have

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