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Introductory Chapter: Squamous Cell Carcinoma (SCC)

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1. Introduction

Squamous cell carcinoma (SCC) is one of the most encountered types of cancers worldwide. It is an aggressive disease that affects the majority of the human body organs including the lungs, head and neck, esophagus, skin, genitourinary tract, thyroid, and other parts. SCC is a highly metastasizing disease with a relatively low overall survival rate. In addition to the traditional chemotherapy and radiotherapy, a combination of treatment modalities endeavors to ameliorate the survival rate of its various subtypes [1, 2]. Immunotherapy also tries to take part in SCC therapy by demonstrating durable improvements by hindering the immune system inhibitory interaction between the programmed cell death protein 1 (PD-1) and its ligand PD-L1 in the cells [3]. Moreover, the targeted inhibition of the cell signaling pathways as the PI3K and the MAPK has proven a novel promising therapeutic domain [4, 5]. Cyclin-dependent kinase (CDK) 4/6 inhibitors are another new group of small molecules targeting the cyclin D1-CDK4/6-Rb pathway involved in the cell cycle control [6, 7].

Oral squamous cell carcinoma is considered among the six most common cancers in the world. It is a subgroup of the upper aerodigestive tract and mostly affects the anterior tongue with the cheek, the floor of the mouth, the retromolar space, the gingiva, or any other part of the oral cavity [8]. The etiology and pathogenesis of all head and neck squamous cell carcinomas are majorly influenced by environmental and lifestyle risk factors, including tobacco use, excessive alcohol consumption, papilloma virus infection (predominantly HPV 16), and exposure to toxic substances, in addition to other dietary factors as salt-preserved food [9]. The esophageal squamous cell carcinoma is similarly affected by environmental and lifestyle-related factors such as tobacco use; alcohol overconsumption; salt-pickled or salt-cured and moldy foods; carcinogens as nitrosamines, polycyclic aromatic hydrocarbons, aromatic amines, various aldehydes, and phenols; vitamin (A, C, E, B) and mineral (zinc, selenium) deficiencies; extremely hot beverages; and fungal and HPV (16, 18) infections [10]. Human papilloma virus infection has also been implicated in the etiology of anal squamous cell carcinoma and especially in HIV-infected individuals, smokers, sexually perverted intercourses, and multi-sexual partners [11]. HPV infection is not known to be associated with the development of cutaneous squamous cell carcinoma; some sporadic cases, however, have suggested that cutaneous infection with HPV in immunocompetent hosts is prevalent in SCC development [12]. Other known risk factors implicated in SCC manifestation are exposure to solar ultraviolet radiation (UVR) and tanning bed usage, especially in the fair skin population [12–14]. Older age, male gender, cigarette smoking, chronic skin ulcers, and burn scars are also documented risk factors [12, 15]. Immunocompromised patients with organ transplantations are also at high risk of

developing SCC [12, 13]. Moreover, some genetic disorders as the recessive dystrophic epidermolysis bullosa, which is caused by loss-of-function mutations in the collagen type VII (C7), can lead to the appearance of aggressive form of cutaneous squamous cell carcinoma [16, 17]. Actinic keratoses, a form of premalignant lesions directly related to skin photodamage, are highly associated to SCC development as well [18].

In the following chapters, deepest information with each of these SCC sub-groups will be widely discussed in order to decipher the basic data behind their mechanism of pathogenesis and possible therapeutic modalities. Nowadays, a variety of new therapeutic approaches based on genetic identification has proven efficacy in prolonging disease-free survival and was adopted in different scientific establishments. Targeted and immunotherapies have succeeded to add a fingerprint to the traditional chemo- and radiotherapies in prolonging the overall survival of many cancer types, even though a considerable amount of side effects has to be taken into consideration. This book, therefore, was designed to cover information related to SCC, including types, classifications, diagnostic methods, staging, and treatment, and to highlight the newest approved therapeutical methodologies, with the ongoing promising clinical trials that may add value to the existing treatments.

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