

## CHAPTER

# 8

## Receptor Tyrosine Kinase Signaling Pathways as a Goldmine for Targeted Therapy in Head and Neck Cancers

---

Muzafar A. Macha<sup>1,2\*</sup>, Satyanarayana Rachagani<sup>1</sup>, Sanjib Chaudhary<sup>1</sup>, Zafar Sayed<sup>2</sup>, Dwight T. Jones<sup>2</sup> and Surinder K. Batra<sup>1,3,4\*</sup>

<sup>1</sup> Department of Biochemistry and Molecular Biology

<sup>2</sup> Department of Otolaryngology/Head & Neck Surgery

<sup>3</sup> Eppley Institute for Research in Cancer and Allied Diseases

<sup>4</sup> Buffett Cancer Center, University of Nebraska Medical Center (UNMC), Omaha, NE, 68198-5870, USA.

### Introduction

Head and neck squamous cell carcinoma (HNSCC) includes tumors of the oral cavity, nasopharynx, oropharynx, hypopharynx, larynx and paranasal sinuses. It is one of the six most common cancers accounting for over 600,000 new cases and 350,000 deaths annually worldwide [1]. In the United States alone, 53,260 (38,380 males and 14,880 females) new cases and over 10,750 deaths are estimated in 2020 [2], together accounting for about 3.6% of new cancer cases and 2% of cancer related deaths. Squamous cell carcinoma (OSCC) of tongue and mouth are the major subtypes of HNSCC which accounts for two-third of the cases represented in developing countries and approximately 31,980 cases in the United States annually [2]. The other anatomical distribution of the OSCC includes approximately 17,950 cases of the pharynx and about 3,330 cases of other oral cavity cancers [2]. Smoking and excessive alcohol consumption are the major risk factors in OSCC development in the western countries, while use of smokeless tobacco products such as gutkha, pan masala and betel quid remain the major risk factors in the Asian countries [3-6]. However, the human papilloma virus (HPV) associated oropharyngeal (OPC) cancers, particularly in younger patients with little or no smoking or alcohol history [3] is on surge. At the current rate of infection, the annual incidence of HPV-positive OPCs is expected to surpass cervical cancer in the United States by 2020 [7]. Of the 40

---

\*Corresponding author: muzafar.macha@unmc.edu; sbatra@unmc.edu