

Telomerase, a Biomarker in Oral Cancer Cell Proliferation and Tool for Its Prevention at Initial Stage

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Abstract : As cancer populations is increasing sharply, the incidence of oral squamous cell carcinoma (OSCC) has also been expected to increase. Oral carcinogenesis is a highly complex, multistep process which involves accumulation of genetic alterations that lead to the induction of proteins promoting cell growth (encoded by oncogenes), increased enzymatic (telomerase) activity promoting cancer cell proliferation. The global increase in frequency and mortality, as well as the poor prognosis of oral squamous cell carcinoma, has intensified current research efforts in the field of prevention and early detection of this disease. The advances in the understanding of the molecular basis of oral cancer should help in the identification of new markers. The study of the carcinogenic process of the oral cancer, including continued analysis of new genetic alterations, along with their temporal sequencing during initiation, promotion and progression, will allow us to identify new diagnostic and prognostic factors, which will provide a promising basis for the application of more rational and efficient treatments. Telomerase activity has been readily found in most cancer biopsies, in premalignant lesions or germ cells. Activity of telomerase is generally absent in normal tissues. It is known to be induced upon immortalization or malignant transformation of human cells such as in oral cancer cells. Maintenance of telomeres plays an essential role during transformation of precancer to malignant stage. Mammalian telomeres, a specialized nucleoprotein structures are composed of large conctamers of the guanine-rich sequence 5'-TTAGGG-3'. The roles of telomeres in regulating both stability of genome and replicative immortality seem to contribute in essential ways in cancer initiation and progression. It is concluded that activity of telomerase can be used as a biomarker for diagnosis of malignant oral cancer and a target for inactivation in chemotherapy or gene therapy. Its expression will also prove to be an important diagnostic tool as well as a novel target for cancer therapy. The activation of telomerase may be an important step in tumorigenesis which can be controlled by inactivating its activity during chemotherapy. The expression and activity of telomerase are indispensable for cancer development. There are no drugs which can effect extremely to treat oral cancers. There is a general call for new emerging drugs or methods that are highly effective towards cancer treatment, possess low toxicity, and have a minor environment impact. Some novel natural products also offer opportunities for innovation in drug discovery. Natural compounds isolated from medicinal plants, as rich sources of novel anticancer drugs, have been of increasing interest with some enzyme (telomerase) blockage property. The alarming reports of cancer cases increase the awareness amongst the clinicians and researchers pertaining to investigate newer drug with low toxicity.

Keywords : oral carcinoma, telomere, telomerase, blockage

Conference Title : ICOSMPR 2018 : International Conference on Oral Surgery, Medicine, Pathology and Radiology

Conference Location : London, United Kingdom

Conference Dates : May 14-15, 2018