

Chapter 10

Bioactive Glasses for Cancer Therapy

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10.1 THE TRUTH ABOUT CANCER

10.1.1 Definitions

Cancer is a group of over 100 diseases characterized by abnormal uncontrolled cell growth with the potential to invade or spread to other parts of the body (Anon., 2014a,b). In a healthy body, cells grow, undergo apoptosis, and get replaced in an orderly process. Impairment or mutation in the deoxyribonucleic acid (DNA) within the cell nucleus by environmental or internal factors sometimes results in a condition where cells that do not undergo apoptosis continue to start multiply such that a mass of cancer cells or a tumor develops (Parsa, 2012). Not all tumors are cancerous: a tumor can be cancerous or benign, where a benign tumor can grow but does not spread to other parts of the body (Table 10.1). On the other hand, a cancerous tumor is malignant, meaning it can grow and spread to other parts of the body. Most cancer related deaths are due to metastasis, that is, malignant cells that penetrate into the circulatory system and establish colonies at other parts of the body (van Zijl et al., 2011). With the progress in current biomedical technology, great advancements have been made; however, cancer is still the leading cause of death for people under the age of 85. In the United States, one in every four people dies from cancer (Anon., 2017).

10.1.2 Types of Cancer

Cancer can be divided into four main categories based on the location where it occurs (Fig. 10.1).

(1) Carcinomas

Carcinomas are one of the most common types among cancer which usually form solid tumors. A carcinoma usually starts within the skin or the tissue that