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First Draft (Introduction)

Cancer is among the greatest killer diseases of the 21st century. Several factors cause cancer infection.

A range of these factors either falls within the category of hormonal factors or behavioral factors. Hormonal factors include genetic mutations and somatic mutations while behavioral factors include smoking and lack of nutrition (Frank and Nowak, 2004, p. 291). Genetic mutations cause cancer because a range of genetic errors causes the rapid multiplication of cells, which eventually lead to the formation of cancer. For instance, for liver cancer, a perfectly healthy liver may experience excessive injuries to cells because of genetic mutations (Frank and Nowak, 2004, p. 291). Consequently, genetic errors are bound to accumulate and unhealthy cells may rapidly multiply to cause the disorganization of cells. This cell disorganization causes cancerous cells (Gold, Slone, Manley and Ames, 2002).

Somatic mutations are notorious in damaging normal cells. Cell damage leads to cancer formation. Somatic mutations work by altering body cells to

cause cancer and other diseases (Frank and Nowak, 2004, p. 291). The theory behind the causes of cancer (through mutation) has been existent for the past 50 years. This theory notes that cancer primarily develops from a single somatic mutation cell, which has undergone years of DNA mutation (Frank and Nowak, 2004, p. 291). Its link with cancer therefore emanates from the fact that cancer is a disease of cell mutations, which affect the cell cycle, thereby causing the disease.

Somatic mutation is at the center of the alterations in cell cycles (Frank and Nowak, 2004, p. 292). Behaviorally, around the world, smoking has been singled out as the most notorious behavioral cause of cancer (Frank and Nowak, 2004, p. 291).

For instance, a fifth of all cancer cases in the world are attributed to smoking (Gold et al., 2002). The most common form of cancer (attributed to smoking) is lung cancer because about four in five lung cancer cases are caused by smoking (Gold et al., 2002). The link between smoking and cancer can be traced to research studies, which affirm that tobacco smoke (for example) consists of more than 80 cancerous substances (Gold et al.

, 2002). Nonetheless, proper nutrition is synonymous with good health. In fact, proper nutritional diets do not only help fight cancers; they also help in fighting other diseases as well. The link between cancer and nutrition is observed from the fact that some types of foods increases one’s risk of developing cancer, while other types of foods support the body in fighting cancer by boosting the immunity (Gold et al., 2002).

The lack of certain types of foods may also increase one’s risk of developing cancer. For instance, patients are often advised to take plant-based foods to manage cancer (Gold et al., 2002). Cancer treatment methods have changed over the years.

Old methods of treating cancer include drug administration, radiation and surgery. However, a newer method of cancer treatment includes nanotechnology (and other transitional drug treatment methods). This paper elaborates on the usefulness of using nanotechnology in the treatment of cancer in Saudi Arabia.

To do this, an explanation of the advantages of nanotechnology over other cancer treatment methods will be evaluated. These advantages will be highlighted by explaining how nanotechnology works and how it is fast and efficient in treating cancer. The latter segment constitutes an explanation of how nanotechnology reduces the side effects of treating cancer and how it facilitates the easy adoption of drugs into the cancerous cells. Consequently, a comprehensive overview of how nanotechnology helps in treating cancer will be explained.

Second Draft (Cancer Treatment Using Nanotechnology)

Saudi Arabia has a relatively lower incidence of cancer when compared to other gulf countries. However, cancer treatment and care in Saudi Arabia is normally different from other countries. The difference emanates from the fact that there is a clash between acceptable and unacceptable cancer treatment methods in the Kingdom. This difference also stretches to the way cancer education is administered, and the manner cancer patients receive

care. Similar to the history of cancer in the US, most cancer cases in Saudi Arabia are diagnosed at a late stage. Often, this problem is influenced by late detection and the use of inefficient and old methods of cancer treatment. Cancer treatment methods are normally diverse and applicable in different types of situations.

Conventional cancer treatment methods include surgery, chemotherapy, and radiation. Surgery works by removing cancerous tumors (surgically) as much as possible (Frank and Nowak, 2004, p. 291). Usually, surgery is used to prevent, treat and diagnose cancer, but ordinarily, during treatment, it is combined with radiation and chemotherapy as auxiliary cancer treatment methods (Frank and Nowak, 2004, p. 291). Chemotherapy is a drug treatment method for treating cancer but unlike other drug treatment methods, it affects the entire human body.

Like other surgery treatment methods, chemotherapy may be used alongside other cancer treatment methods (Frank and Nowak, 2004, p. 291). Lastly, radiation works by killing cancerous cells and shrinking certain types of tumors. Similarly, radiation also works by destroying the DNA of cancerous cells thereby causing their inactivity. Due to the inefficiencies associated with the above methods of cancer treatment in Saudi Arabia, it is crucial to adopt newer methods of cancer treatment. Nanotechnology is one such method. Saudi Arabia reports increased causes of cancer every year.

For instance, 7, 000 new cancer cases are reported every year and it is estimated that in 15 years, the kingdom will report more than 30, 000 new cancer cases annually (Gold et al., 2002). These statistics abound, the future

of cancer care and treatment in Saudi Arabia rests with nanotechnology. From an electromagnetic point of view, the adoption of nanotechnology in Saudi Arabia includes the understanding of Paclitaxel-Loaded Gelatin Nanoparticles, Light Absorption by Gold Nanoparticles and Magnetic Nanoparticle Hyperthermia Methods as the main forms of cancer treatment. Paclitaxel-Loaded Gelatin Nanoparticles is a constituent of electromagnetic cancer treatment method (in nanotechnology), which is commonly used in the treatment of intravesical bladder cancer (Gold et al.

, 2002). In a study to test the efficiency and use of Paclitaxel-Loaded Gelatin Nanoparticles in treating bladder cancer, it was established that " Paclitaxel-loaded gelatin nanoparticles represent a rapid release, biologically active paclitaxel formulation that can be used for intravesical bladder cancer therapy" (Torchilin, 2007, p. 128). Its efficacy is therefore undisputed. Gold nanoparticles are exclusive components of cancer treatment using electromagnetic nanotechnology treatment methods. Gold nanoparticles are normally finer than dust particles (Gold et al., 2002).

These particles normally contain " peptide" which draws nanospehers directly to the cancerous cells and destroying them (Huang, Jain, El-Sayed and El-Sayed, 2007, p. 681). Magnetic nanoparticle hyperthermia method is normally used in the early detection of cancer because it is ordinarily contrasted with MRI imaging. The magnetic nanoparticle hyperthermia method works by producing nanoparticle suspensions that are highly effective in the early detection of tumors (Prijic and Sersa, 2011, p. 1). The magnetic nanoparticle hyperthermia method will be useful in the early

detection of cancer because most cancer cases in Saudi Arabia are diagnosed late.

Nanotechnology will offer several advantages to the diagnosis, treatment and care of cancer patients in Saudi Arabia. Among the greatest advantages of nanotechnology over other cancer treatment methods is its early detection of cancer. This advantage emanates from the fact that, nanotechnology has a stronger accuracy and precision than conventional cancer detection methods (Mansoori et al, 2007, p. 226). Precisely, electromagnetic technology aids in detecting DNA alterations at a very early stage in the development of cancer. In fact, advanced electromagnetic technology in cancer treatment helps in exclusively binding cancer cells and isolating normal cells (Mansoori et al, 2007, p.

226). The second greatest advantage of nanotechnology is its accuracy in treating cancer because it has a stronger sense of precision and thoroughness when compared to conventional cancer treatment methods in Saudi Arabia (Mansoori et al, 2007, p. 226). In fact, the greatest promise that nanotechnology offers in cancer treatment is the fact that, it can destroy dangerous cancer cells, which have been normally resistant to conventional treatment methods. Advanced electromagnetic nanotechnology is often combined with radiation therapy to focus cancer treatment on the specific cancer cells using laser light technology to destroy the cancer cells from within (Mansoori et al, 2007, p. 226). This treatment method improves cancer treatment. It is through this technology that nanotechnology helps to focus drug treatment methods on the cancer cells.

Future nanotechnology guarantees the alteration of cancer DNA, returning them back to normal cells. The above advantages will significantly improve the diagnosis, treatment and care of cancer patients in Saudi Arabia.

Conclusion

Though there are few statistics regarding the use of nanotechnology cancer treatment in Saudi Arabia, this paper highlights the use of nanotechnology as the future of cancer treatment, diagnosis and care in Saudi Arabia. Weighing the functionality of nanotechnology and its contribution to cancer treatment, we can establish that nanotechnology will greatly improve the efficiency and precision of cancer treatment in Saudi Arabia. From a broader point of view, nanotechnology brings immense hope in the treatment of cancer such that if a person were diagnosed with cancer, this diagnosis should not amount to an automatic death sentence. However, the use of nanotechnology in Saudi Arabia needs to be understood from the understanding of paclitaxel-loaded gelatin nanoparticles, light absorption by gold nanoparticles and magnetic nanoparticle hyperthermia methods as the main forms of cancer treatment. Since nanotechnology is more efficient and fast in treating cancer, the future of cancer treatment in Saudi Arabia is expected to change dramatically.

Among the greatest advantages of nanotechnology treatment in Saudi Arabia, which is identified in this paper, is the efficiency associated with nanotechnology (Frank and Nowak, 2004, p. 291). In fact, conventional cancer treatment methods (such as chemotherapy and radiation) are synonymous to cancer resurfacing, thereby warranting the use of higher dosages of cancer treatment drugs in the management of the disease.

Nanotechnology eliminates the possibility of cancer resurfacing by making the entire treatment process more efficient.

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