Executive Summary

In the executive summary you will be expected to include the following:

- state the subject of the report
- state how the information was obtained/analyzed
- summarize the key problems
- summarize the main solutions
- state key recommendations
- identify the limitations of the report

Despite advancements in the medical field and progress in the treatment of many diseases, cancer is a disease for which a fixed treatment plan does not yet exist. Hence, the objective of this report is to examine the role nanotechnology has to play in the treatment of cancer; providing an alternative to the traditional methods of treatment like chemotherapy and radiotherapy. The main methodology used for research was document searching, which provides updated information on the topic.

There are four main problems that obstruct the clinical use of nanotechnology for cancer treatment. Firstly, the nanoparticles used should be specific to the tumor cells. In addition to being different from normal cells, these cells vary from one type of cancer to another. Secondly, nanoparticles carry the risk of introducing toxins to the body. Due to variations in the environment and body temperature, nanoparticles can break down releasing their constituents, which can stimulate immune responses or even poison normal cells with toxins. Thirdly, nanotechnology is not a cheap option and funds are required for both the manufacturing and operation. Fourthly, there is a risk of inconsistency during the manufacturing of large batches of complex nanoparticles and, hence, a clear evaluation pathway is necessary.

Based on the points listed in the problems section, the team suggested solutions. These solutions deal with new techniques that will make the use of nanotechnology more effective. The broad subject of nanotechnology constitutes: gene therapy that diminishes the probability of toxicity, photodynamic drug therapy which allows accurate targeting of cells, radiotherapy which is readily available and non-toxic and cancer theragnostics which diagnoses and treats cancer simultaneously.

Nanotechnology operates by selectively treating tumor cells while inflicting minimal damage to normal cells. It involves the use of materials at the nano-scale level as carriers of drugs and genes. Limitations associated with nanotechnology mentioned in the problems section are addressed in the solutions section. These solutions include research to develop optimal surface designs to ensure specificity, size, shape and compatibility to avoid toxicity, involving the pharmaceutical industry to reduce cost on researchers and a clear evaluation strategy to avoid quality problems.

This report recommends four main steps: researchers and authorities should decide on the optimal practical design, they must pay attention to stability, cost and time, should address toxicological challenges such as body temperature variations and should consider the use of computer sciences to develop precise screening techniques.

The major limitation in this report is the lack of time to research and produce this report and the unavailability of practical results to support theory.