Steven M Mufamadi et al., J Nanomed Nanotechnol 2018, Volume 9
DOI: 10.4172/2157-7439-C7-086



## Green synthesis of silver nanoparticles for nanomedicine: The next breakthrough in oncology

**Steven M Mufamadi and Jiya M John**
Nabio Consulting (Pty) Ltd, South Africa

Cancer is a global threat; about 8.2 million people die as a result of cancer each year. In South Africa, cancer has increased from 5.6 to 9% between 2006 and 2015. Nanotechnology is a most promising field for generating new applications in medicine. The anti-proliferative and apoptosis inducing properties of silver Nanoparticles (Ag NPs) makes them ideal candidates for anticancer therapy. The purpose of this study is to illustrate the biological synthesis of Ag NPs using plant extracts for nanomedicine; also, to showcase the mechanism of action of the Ag NPs on cancer cell lines and the potential impact in oncology. Green synthesis of Ag NPs is a simple synthetic technique which could be achieved by blending of silver ions together with plant extracts, which can act as reducing and capping agents, to form Ag NPs with different sizes and shapes. This approach offers simplicity, rapid synthesis, environment friendly, inexpensive biological procedure for nanoparticle fabrication with low systemic toxicity to human. Additionally, green synthesis approach using plant extracts are easy to scale up for larger-scale production of nanoparticles. The use of Ag NPs as a new generation of anticancer therapy showed improved *in vitro* anti-cancer efficacy against different cancer cell lines at low concentration. The main mechanism of action of Ag NPs on cancer cell death involves the uptake of Ag NPs inside the cell via endocytosis or diffusion which causes mitochondrial dysfunction and formation of Reactive Oxygen Species (ROS), resulting in damage to cellular components such as proteins, DNA and cell membrane. Many studies showed that cell uptake and anticancer activity to be influenced by nanoparticle's size (1-100 nm). The toxicity of green synthesized Ag NPs on normal cells highly depends on the plant extract used for the stabilization and reduction of metal ion. Green silver nanotechnology using plant extracts promising to offer anticancer therapy at atomic scale and molecular level. However, in-depth study on Ag NPs properties in mammalian immune system and *in vivo* toxicity study is recommended in order to confirm safety and clinical significance.

### Biography

Steven M Mufamadi is the Founder of Nabio Consulting Ltd, a start-up company on nanotechnology and biotechnology that is based in South Africa (SA). His expertise is on bionanotechnology and nanomedicine formulations for pharmaceutical application. He is also a Co-Founder of the nanotechnology symposia series on HIV/AIDS, TB, malaria, cancer, energy and water in partnership with SA government, an initiative that is aiming on facilitation of nanotechnology development, innovation, commercialization and public engagement in SA through dialogues between government/policy makers, researchers, industry, entrepreneurs and investors.

Steven.Mufamadi@gmail.com

**Notes:**