Academy of Romanian Scientists *Volume 9, No. 1, 2020, pp. 97- 139*
Annals Series on Biological Sciences ISSN 2285 – 4177
 REVIEW

Silver and Gold Nanoparticles: Challenges and Perspectives

Madalina Anca UJICA[1], Gertrud Alexandra PALTINEAN[1], Aurora MOCANU[1], Maria TOMOAIA-COTISEL[1, 2 *]

[1] Faculty of Chemistry and Chemical Engineering, Research Center of Physical Chemistry, Babes-Bolyai University, Cluj-Napoca, Romania

[2] Academy of Romanian Scientists, Splaiul Independentei nr. 54, sector 5, 050094 Bucuresti, Romania

[*] Corresponding author e-mail: mcotisel@gmail.com, mcotisel.chem.ubbcluj.ro@gmail.com

Abstract
Syntheses of gold nanoparticles (AuNPs) and silver nanoparticles (AgNPs) were evaluated with an emphasis on controlling the size, shape and stability of nanoparticles (NPs). Various reducing and capping agents of NPs from the sphere of chemistry and biology were identified together with their role in synthesis and controlled NPs properties. Those NPs were characterized with a variety of methods in order to determine the activities of nanoparticles and their applications in real life. In addition, carriers of these NPs in-vitro and in-vivo investigations and models of nanoscale interactions are presented. This review also addresses systematically the biomedical applications of AuNPs and AgNPs taking into account the actual challenges and perspectives in this research field.

Key words*:* silver nanoparticles; gold nanoparticles; syntheses, properties, nanoscale interaction models, biomedical applications.

DOI https://doi.org/10.56082/annalsarscibio.2020.1.97

Introduction

The term of "nano" comes from Latin, which means "dwarf" and from the Greek term “nanos”, which means “little”. It is used as a prefix for size orders of 10^{-9} m ranging from 1 to 100 nm; particles of this size are called “nanoparticles”. The most popular and studied metal nanoparticles are gold nanoparticles (AuNPs) and silver nanoparticles (AgNPs) [1-8]. The most important uses of these nanoparticles are biomedical applications [1, 5-7], such as the treatment of cancer and infections occurring in dentistry and orthopedic surgery.