Editorial Open Access

Gold Nanoparticles (AuNP) have been found many applications in chemistry and biochemistry, for example, as labels for bioanalysis or as payload carriers for biotherapeutics. Recently, investigations of the potential risks of the applications of AuNP and its products to human health and to the environment are also dynamic. It is very critical to know the mass or the number of nanoparticles in a sample in order to understand these biological and environmental e ects. is requires analytical methods that focus on the average size of the particles, number of particles, and the total mass of particles in a liquid or solid sample.

Gold content in solutions can be measured by methods such as electrochemical methods, Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), and Flame Atomic Absorption Spectrophotometry (FAAS). ese methods measure the amount of total gold element in a solution a er the chemical digestion of gold, usually by aqua regia or HBr/Br_2 solutions. In 2008, National Institute of Standards and Technology (NIST) released AuNP standards with known gold concentration and average particles diameter of 10, 30, and 60 nm [1]. e gold content was measured by using inductively-coupled plasma optical emission spectrometry (ICP-OES) a er digestion. On the other hand, the average diameter of the AuNP was measured by Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Di erential Mobility Analysis, Dynamic Light Scattering, and Small-Angle X-ray Scattering. In several recent reports the average diameter, total gold content, and number of AuNP have been characterized in natural water systems and uptake in cell lines. In these reports, a combination of TEM and ICP-MS, ICP-OES, or atomic absorption Spectrophotometry (AAS) was used for the AuNP characterization and determination.

Given the diameter of the AuNP and the total amount (in mole, mol/L, number of gold atoms, or gram) of gold, it seems not very hard to calculate the number of AuNP in a suspension:

Citation: Yu L (2012) Estimate the Population Density of Gold Nanoparticles in Suspensions from Experimental Data. Biochem Physiol 1:e111. doi:10.4172/2168-9652.1000e111

Weighted mean radii of AuNP should be obtained and used depending on the measurement methods. In these methods, the probabilities of each particle are picked and measured are identical or di erent. e probability may proportional to the radius, cross-section area, surface area, or volume, which are the weights of the mean. Currently, TEM is the prevailing method of AuNP radius measurement. When TEM is used, the probability of each AuNP is picked and measured is the same either by so ware or by operator. erefore, the arithmetic mean values should be obtained by a number

pID /Figher1A1001C0002metic