

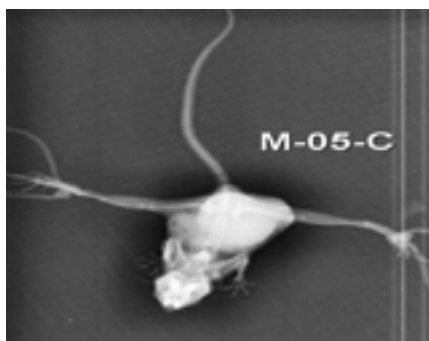
# 11<sup>th</sup> EUROPEAN BIOSIMILARS CONGRESS

April 26-27, 2018 Rome, Italy

## Applications and advantages of gold nanoparticles as X-ray contrast agent

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X-ray medical imaging is one of the most important imaging techniques because of its low cost and reachable technique. But it has poor ability to depict soft tissues and small details between soft tissues at the borders of interference. This limitation was overcome by using iodine-based contrast agent but this chemical compound has limitations for use due to its toxicity and side effects. Ten years ago, a new variant contrast agent of medical X-ray imaging was discovered, developed and under study to date. The new variance factor is gold nanoparticles, which may overcome these limitations because of its excellent properties, where the biological distribution of these particles is higher than iodine compounds. The interaction between bones and soft tissue is more apparent, stay longer at the targeted site which allows for a longer imaging time and all of the above factors enhance the X-ray diagnostic ability. This study consists of the synthesis of gold nanoparticles, animal preparation (which includes a selection of animal type, housing, preparing the tumor and tumor implantation), intravenous administration of gold nanoparticles to infected mice then X-ray imaging was taken by conventional X-ray unit. The resulted X-ray images demonstrated that gold nanoparticles were attractive to move towards tumor site through the general circulation and spent more time at the tumor site (inverse the iodine contrast agent) which allows for a longer time of imaging, lower levels of toxicity and side effects. All of the mentioned factors lead to enhancement of X-ray diagnostics (i.e. obtained X-ray images contain the site of abnormality, two dimensions abnormality map, extra details of bone-soft tissue interference and high contrast level)..



**Figure:** The figure shows enhancement of the X-ray images abilities in the reorganization of abnormal soft tissue and increase of the overall resolution level of the image based on the usage of gold nanoparticles as contrast agent.

### Recent Publications

1. E Boisselier and D Astruc (2009) Gold nanoparticles in nanomedicine: preparations, imaging, diagnostics, therapies and toxicity. *Chemical Society Reviews*. 38(6):1759-1782.
2. Na Li, P Zhao, D Astruc, M R Ivanov, H X, J Pk and M A Al-Sayed (2010) Gold nanoparticles for biology and medicine. *Small*, 1(1): 3280–3294.
3. S Ahn, S Y Jung and S J Lee (2013) Gold nanoparticle contrast agents in advanced X-ray imaging technologies. *Molecules*. 18(5):5858-5890.
4. Cole L E et al. (2015) Gold nanoparticles as contrast agents in X-ray imaging and computed tomography. *Chemical Reviews*. 10(2):321-341.
5. J F Hainfeld et al. (2006) Gold nanoparticles: a new X-ray contrast agent. *British Journal of Radiology*. 79(939):248-253.

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## **Biography**

Mohammed H. Alwan has completed his Bachelor degree from Baghdad University/ Iraq in 2004 then studied for M.Sc degree in Al-Nahrain University/ Iraq in 2015. He spent ten years serving as Biomedical Engineer at the Ministry of Health institutes/ Iraq started at 2005 in Al-Karamaa general Hospital and in Ibn-Al-Bitar Center for Cardiac and Vascular Diseases and Al-Sadr General Hospital then at 2015 in the Middle Euphrates center for oncology at Al-Najaf health directorate.

Logean Qadri Al-Karam in Al-Nahrain University/ College of Engineering/ Biomedical Engineering Department. B.Sc. in Material Engineering / University of Technology, 2000. M.Sc. in Material Science / subspecialty in the Polymers 2008. Training in Department of Materials Engineering, Auburn University, Auburn, AL, USA. Hands-on laboratory experience in synthesis and characterization of ceramics, nanoparticles and ceramic polymer hybrid composites under of Dr. Z. Y. Cheng in 2013, PhD in Material Science/ subspecialty in Nanotechnology, 2014. Teaching in the following subjects now: Materials Science, Biomaterials, Physics, Application of Medical Engineering. The important publishing researches about (7) researches.

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