

## Novel Multivalent Glyco-gold Nanoparticles to Inhibit Bacterial Fim H

Tao Wang, Ravikumar Jimmidi and Stéphane P. Vincent

University of Namur, Belgium



### Abstract

The accelerated drug resistance of bacteria is one of the most serious problems in global healthcare and the difficulties in finding new antibiotic drugs are even more challenging. Almost 80% of bacterial infections of living tissues are associated with bacterial biofilms, including lung infections of cystic fibrosis patients, colitis, urethritis, conjunctivitis, otitis, endocarditis and periodontitis. Multivalency is ubiquitous in biological interactions, especially in carbohydrate-mediated processes. The low affinity of carbohydrate-mediated interactions is compensated by clustering of the ligands. However, in real biological systems, the interfaces are usually not flat, which exhibit distinct size-features from microns (e.g., cell membranes) or sub-micron (e.g., organelles or vesicles) to several nanometers (e.g., proteins, micelles). theoretical investigation indicated the size may have great influence on folding of proteins adsorbed on nanoparticles.[4] At the same time, gold nanoparticles have interesting characteristics including a three-dimensional (3D) polyvalent carbohydrate network, a globular shape and a chemically well-defined composition.

In this project, we have designed novel multivalent gold nanoparticles with functionalized fullerene-C60, to investigate size-effect of inhibition of bacterial biofilms by the gold nanoparticle conjugates.

### Speaker Publications:

1. "Classical Monocyte Transcriptomes Reveal Significant Anti-Inflammatory Statin Effect in Women with Chronic HIV" *Journal of Cardiovascular Research* July13, 2020;
2. "A mini review of the crossed molecular beam apparatus in molecular reaction dynamics" *Journal of Saudi Chemical Society* Volume 23, Issue 1, January 2019, Pages 1-6
3. "Measurement and theoretical analysis of transient liquid film during micro-channel flow boiling.;" *International Journal of Multiphase Flow* Volume 130, September 2020, 103365
4. "Quantum interference in  $H + HD \rightarrow H_2 + D$  between direct abstraction and roaming insertion pathways"; *Journal of science* Vol. 368, Issue 6492, pp. 767-771
5. "Numerical investigation on heat transfer of supercritical carbon dioxide in the microtube heat exchanger at low reynolds numbers" *International Journal of Heat and Mass Transfer* Volume 151, April 2020, 119448

[11th International Conference on Chemistry Webinar](#)– July 20-21, 2020.

### Abstract Citation:

Tao Wang, Novel Multivalent Glyco-gold Nanoparticles to Inhibit Bacterial Fim H, *Chemistry World 2020, 11<sup>th</sup> International Conference on Chemistry Webinar* July 20-21, 2020.

(<https://chemistrymeetings.conferenceseries.com/abstract/2020/novel-multivalent-glyco-gold-nanoparticles-to-inhibit-bacterial-fim-h>)



### Biography:

Tao WANG received his Master's degree in "Medicinal Chemistry" from the University of Guizhou in 2012. In 2013, he worked as a lecturer at the School of Pharmaceutical Engineering of Guizhou Institute of Technology. In 2016, he started his PhD titled "Novel Multivalent Molecules as Antibiofilm and Antibacterial Agents" at the University of Namur under the supervision of Professor Stéphane VINCENT

in the research unit of Organic and Bio-organic Supramolecular Chemistry.