

## Microsymposium

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### *The use of Gold Nanoparticles as additives in Protein Crystallization*

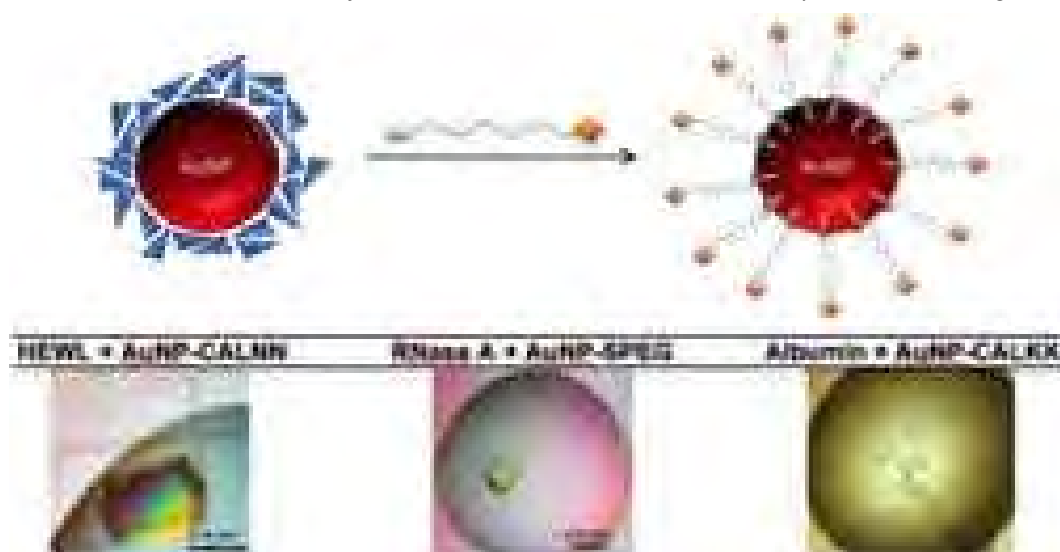
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Gold nanoparticles (AuNPs) exhibit unique properties that have made them a very attractive material for application in biological assays [1]. Given the potentially interesting interactions between AuNPs and biological macromolecules, we investigated AuNPs-induced protein crystal growth [2]. Differently functionalized AuNPs were tested as additives in co-crystallization studies with model proteins (hen egg white lysozyme (HEWL), ribonuclease A (RNase A) and proteinase K) as well as with case studies where there were problems in obtaining well-diffracting crystals. Trials were performed considering different crystallization drawbacks, from total absence of crystals to improvement of crystal morphology, size, twinning and number of crystals per drop. Improvement of some of these factors was observed in the cases of HEWL, RNase A, phenylalanine hydroxylase (PAH), myoglobin, native aldehyde oxidase (AOH) and human albumin. In these proteins, the presence of the AuNPs promoted an increase in the size and/or better crystal morphology. From the systematic trials and subsequent observations, it can be concluded that the introduction of AuNPs should definitely be considered in crystal optimization trials to improve previously determined crystallization conditions. Acknowledgments The work was supported by the Portuguese Science and Technology Foundation (FCT-MEC) through grants PTDC/CTM-NAN/112241/2009 to RF, PEst-C/EQB/LA0006/2011 and PEst-C/EQB/LA0006/2013 (to Associate Lab REQUIMTE).

[1] M.G. Blaber, M.J. Ford, M.B. Cortie in *Gold, Science and Applications* (Corti, C. & Holliday, R.) Chapter 2 (Taylor and Francis Group, LLC, 2010), [2] D. Ribeiro, A. Kulakova, P. Quaresma, E. Pereira, C. Bonifácio, M. J. Romão, R. Franco, A.L. Carvalho, *Crystal Growth & Design*, 2013, in press



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