



# Synthesis of sugar-based ligands to evaluate the protein-corona formation on gold nanoparticles surface

Ruth Mateu Ferrando<sup>1,\*</sup>, Laura Polito<sup>2</sup>, Luigi Lay<sup>1</sup>

<sup>1</sup>Università degli Studi di Milano, via C. Golgi 19, 20133, Milan, Italy.

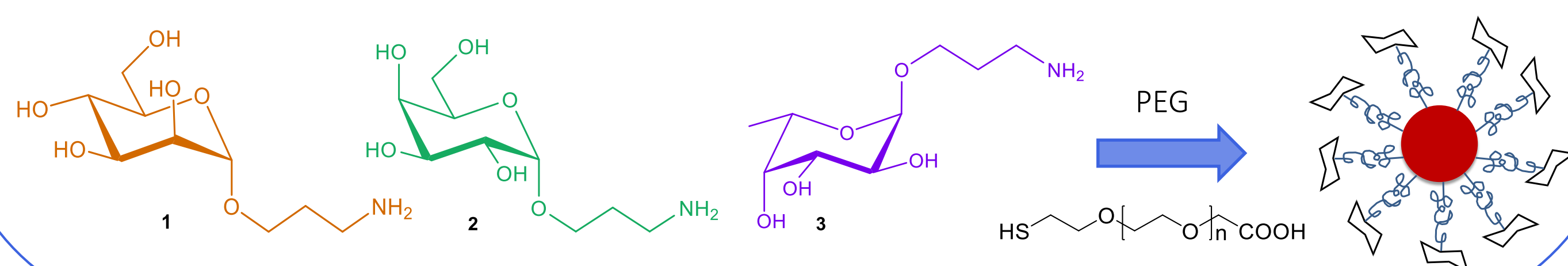
<sup>2</sup> CNR – SCITEC, Nanotechnology Lab, via G. Fantoli 16/15, 20138, Milan, Italy.

\*[ruth.mateu@unimi.it](mailto:ruth.mateu@unimi.it)

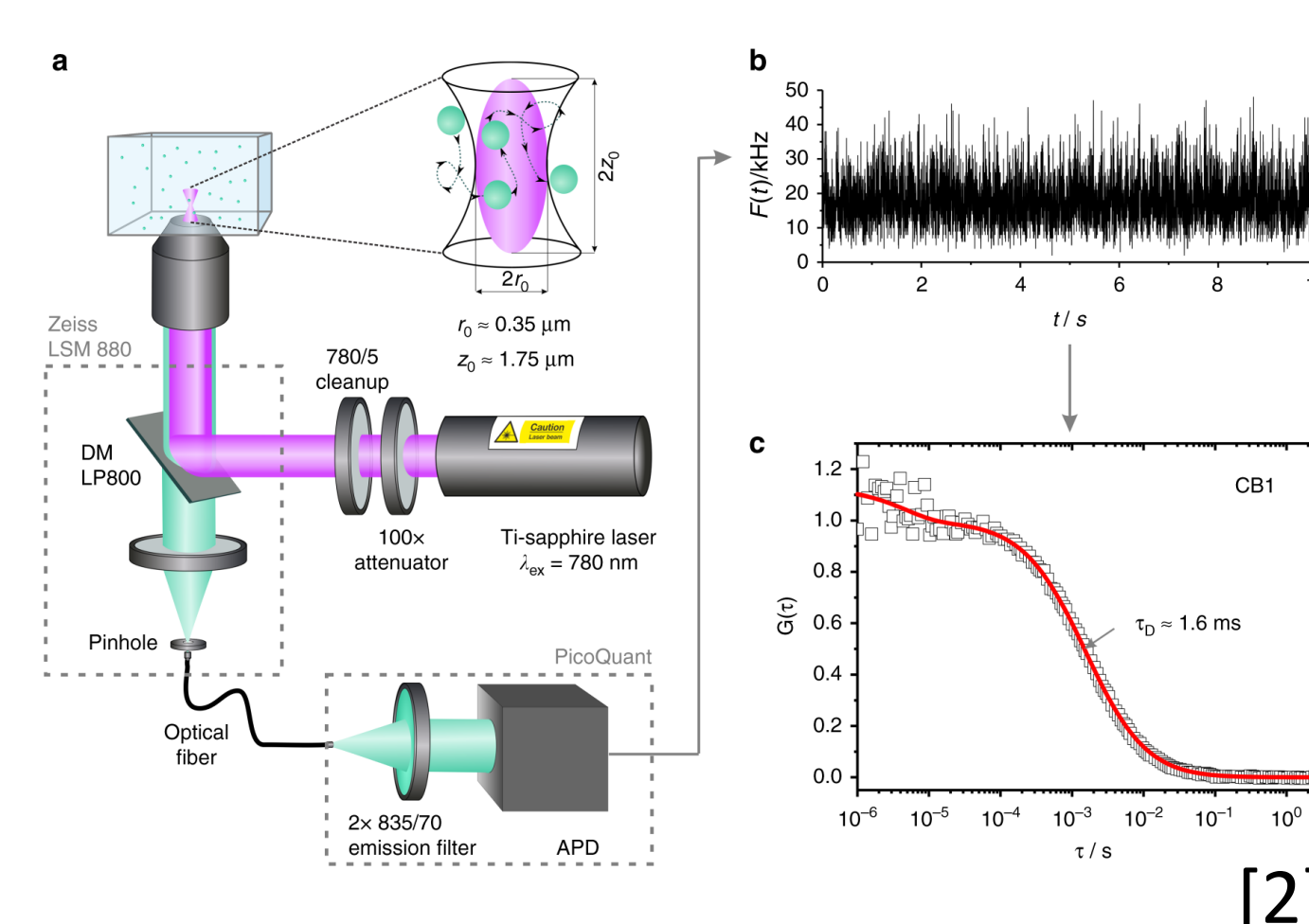
## Aim

A universal phenomenon observed when gold nanoparticles (Au NPs), including **Au glyco NPs**, are placed in biological fluids is the formation of a so-called **protein corona (PC)**, a coating that shields the NPs surface and has **severe consequences** in nanomaterial's fate, efficacy and toxicity [1]. Understanding the formation and intracellular fate of this PC can be essential towards more promising Au glyco NPs for diagnostic and therapeutic purposes. For this reason, in the present work we aim to:

- Synthesize **mannose**, **galactose** and **fucose** derivatives (1, 2, 3)
- Prepare Au glyco NPs using PEG as a bridge between 1-3 and Au NPs.
- Study Au glyco NPs interaction with different commercially available lectins by means of Fluorescence Correlation Spectroscopy (FCS).

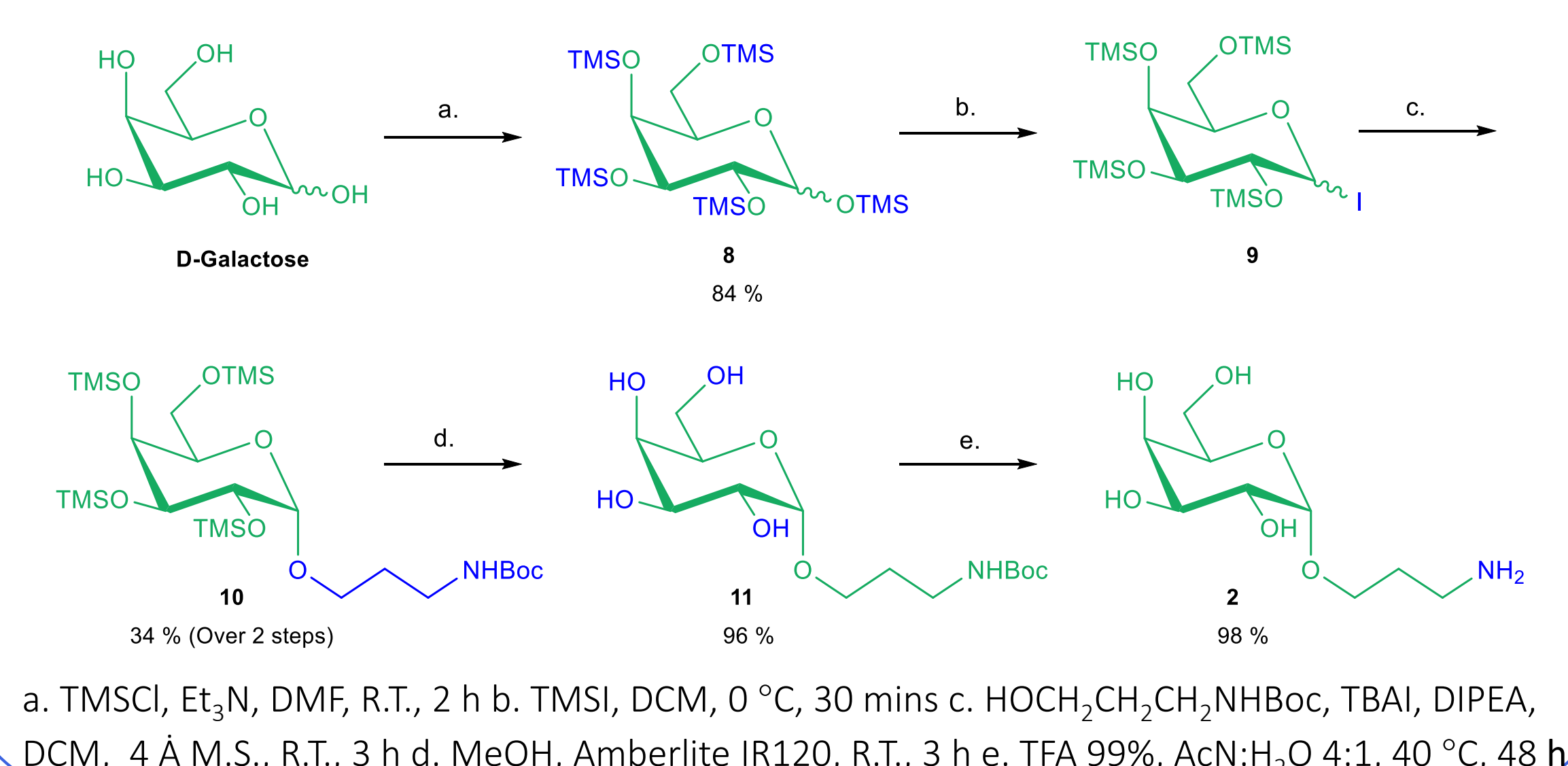
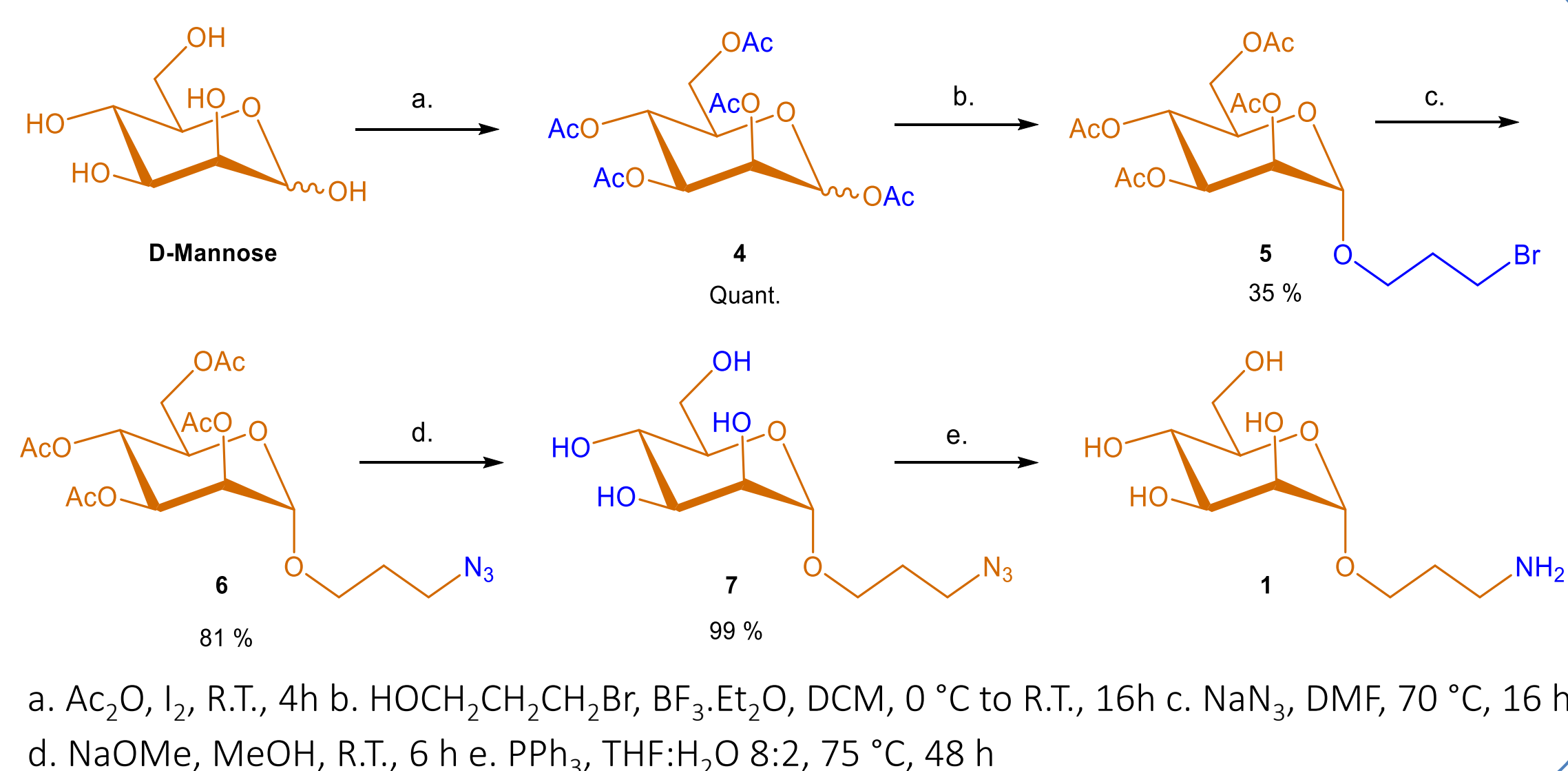


## Fluorescence Correlation Spectroscopy



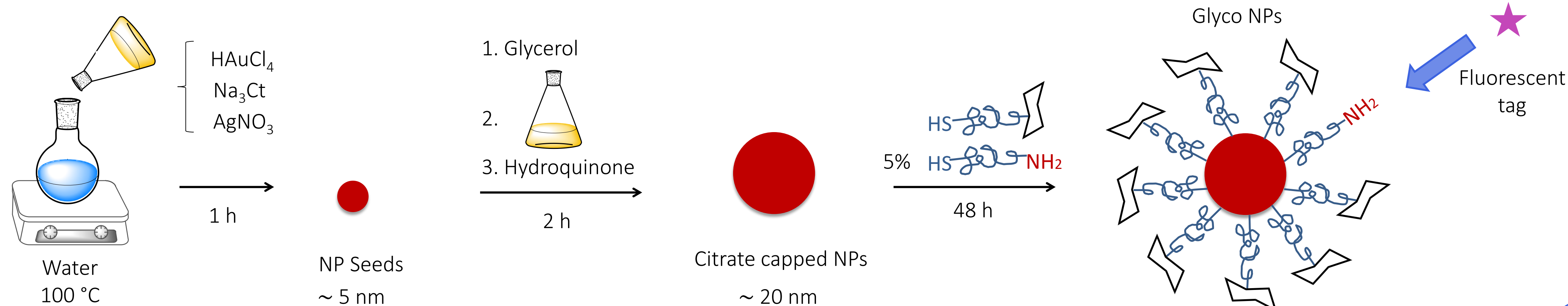
The **intracellular fate** of the PC may influence NPs aggregation, translocation and localization in cells [3]. FCS will be used to study, both in vitro and in cells, the stability of a PC when it is formed from a **lectin** with well-known affinity for the NP sugar coating.

CICbiomaGUNE  
CENTER FOR COOPERATIVE RESEARCH IN BIOMATERIALS



## Future prospects

Synthesis of Au glyco NPs using a modified Turkevich procedure and one-pot functionalization of the surface by direct ligand addition [4]:



SCITEC-CNR



## References

1. Monopoli M. P., Walczyk D., Campbell A., Elia G., Lynch I., Bombelli F.B., Dawson K. A., *J. Am. Chem. Soc.*, 2011, **133**, 2525.
2. I. Negwer, A. Best, M. Schinnerer, O. Schäfer, L. Capelo, M. Wagner, M. Schmidt, V. Mailänder, M. Helm, M. Barz, H. Butt, K. Koynov, *Nat. Commun.* 2018, **9**, 5306.
3. Di Silvio D., Silvestri A., Lay L., Polito L., Moya S., *Sci. Rep.*, 2018, **8**, 9046
4. Silvestri A., Zambelli V., Ferreti A. M., Salerno D., Bellani G., Polito L., *Contrast Media Mol. Imaging*, 2016, **11**, 405-414