

## **Optothermal Manipulation of Cells with Plasmonic Nanoparticles**

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### **[Abstract]**

Light absorbed by plasmonic nanoparticles is very efficiently converted into heat. Gold nanoparticles, for example, can be used as a fine tool to apply heat to only a nanoscopic area which renders it possible to study temperature sensitive processes with unprecedented resolution.

Here, we demonstrate how plasmonic heating can be applied to control cell functions at the nanoscale. As a first example, we will discuss how gold nanoparticles that are bound to a free standing phospholipid membrane can be used to manipulate the membrane's resistance and permeability by adjusting the nanoparticle temperature. Shifting to living cells, we will show that gold particles can even be injected into a single cell by a combination of plasmonic heating and optical force.

In summary, these results illustrate how plasmonic heating can be employed to achieve nanoscale control over biological systems which paves the way for future biomedical applications in nanotheranostics and drug delivery.