Au nanoparticles for targeted photothermal destruction of influenza

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Influenza is caused by influenza virus, which outbreaks yearly and causing three to five million illness and about five hundred thousand deaths [1]. The 1918 Spanish Flu killed more than fifty million people, about 5 percent of the total population at the time [2]. The common treatment for influenza is antivirals. However, evidences have shown that antiviral medication can lead to viral resistance among some strains, and antivirals usually lose effect within a few years [3].

Recently, researchers have found that Au nanoparticles have high absorption in the near infrared (NIR)(650-900nm) light [4]. Since NIR can transmit readily through skin and tissue, the Au nanoparticles injected to animal or human bodies would be heated up significantly responding to NIR radiation. Also, these nanoparticles have good binding properties and can be attached to many traditional biological probes such as antibodies and receptors. This makes them suitable for the photothermal destruction of different targets. El-Sayed et al. have found that when conjugated with antibody, gold nanoparticles can selectively destruct cancer cells with NIR radiation [5].

In our study, we would like to investigate the targeted photothermal destruction effect of modified Au nanoparticles on influenza virus. Influenza virus can infect healthy cells by binding to specific receptors on the cell membrane and enter the cell for replication and proliferation. In order to research the effect of Au nanoparticles on influenza virus, we need to modify these nanoparticles with specific receptors; then infected cells would be treated with these nanoparticles under different concentrations and laser powers to find the condition for optimal destruction effect. Furthermore, different shapes of Au nanoparticles would be synthesized to compare their effect on influenza virus.

*This work is supervised by Professor Thomas Webster, Northeastern University, Boston, MA, USA.

Reference

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