Porous gold nanoparticles for facile inactivation of Influenza A virus

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This article focuses on the inactivation of Influenza A viruses (IAVs) using porous gold nanoparticles (PoGNPs). IAVs have become resistant to the antiviral drugs such as Oseltamivir or Amantadine, because of their frequent genetic mutation. To prevent the antiviral treatment from building up the resistance, we first set the stable antiviral target which remains steady regardless of their subtype, disulfide bonds. As the disulfide bonds in hemagglutinin (HA) show regular pattern in entire HA protein sequence, we assumed that cleaving the disulfide bonds on HA could be an ideal target for IAV attenuation. The PoGNPs expected to show high affinity to the disulfide bonds due to the gold-thiol interaction. We had demonstrated the decrease of the viral infectivity that was exposed to PoGNPs by the MDCK cell viability test with various subtypes of viruses (H1N1, H3N2, H9N2) whereas non-porous 130 nm gold nanoparticles and 130 nm silver nanoparticles showed much less effect on inactivation of viruses. This PoGNP-utilized inactivation process proposes more convenient way for getting inactivated virus under laboratory-sized experiment.