Nanosilver in medicine

For centuries, silver has been used in jewellery, coins and decoration. It is less well known that silver has been valued for almost as long for its medicinal properties. In ancient Greece silver was used to purify drinking water, and just decades ago doctors applied a thin layer of silver to large wounds to prevent infection and promote healing. Silver became less frequently used to prevent infection once antibiotics were invented, but now it is being used again because of the rise in drug-resistant bacteria and new discoveries in materials sciences.

The trouble with silver is that the properties that make it useful for jewellery make it less useful in medicine.

1. What are the properties of silver that make it useful for jewellery and coins?

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2. Why would these properties make it less useful for medicine?

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Normal silver crystals
(Photograph by courtesy of Smith & Nephew)

‘SILCRYST™ coating’ crystals on Acticoat™ dressings
(Photograph by courtesy of Smith & Nephew. Nanocrystalline silver is a patented technology of NUCRYST Pharmaceutical Corp. and SILCRYST™ is a trade mark used under licence by Smith & Nephew. Acticoat is a trade mark of Smith & Nephew).
Nanoparticles of silver are used in wound dressings for burns and serious injuries. The dressing has three layers. There is an absorbent inner core to keep the wound moist, which helps it to heal. Either side of this core is a net made of polythene, which is coated with nano silver. The polythene net is designed so that it does not stick to the wound. The silver kills a wide range of bacteria. It is important that it can begin to kill the bacteria as quickly as possible. The tiny nanoparticles of silver dissolve very quickly once they are moistened (for example by blood from the wound) and the silver can get to work straight away.

5. Why is it important to begin to kill the bacteria as quickly as possible?

6. Why will nanoparticles of silver be more effective against bacteria and work better in a wound dressing than normal silver?

For chronic wounds that can persist for months, such as bedsores and leg ulcers caused by poor circulation, better dressings can prevent serious side effects that might make amputation necessary.

7. Why is it important for scientists to keep trying to improve medical items like dressings?