



# METAL NANOPARTICLES - PAST TO PRESENT

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**Abstract:** - The term nanoparticle is used to describe a wide variety of materials with submicron size distribution. Research in nanotechnology is as diverse as other fields of science such as physics, chemistry, material science, microbiology, biochemistry, and molecular biology. Hence, Nano-science in combination with biotechnology and biomedical engineering is an emerging area related to the development of novel nanostructure materials for imaging, diagnosis, gene sequencing, and drug delivery applications. Ornaments can provide multiple benefits in terms of the economy and human lifestyle. Ornaments play an important role in our ancient ages and modern life style. The present review aims to study the benefits of wearing ornaments, its importance and those involvements in the area of Nano-science and also their uses in the various fields of our life such as medicinal, food industrial and cosmetic fields based on their ultra small size, shape, strength, biocompatibility, availability and high surface area to mass ratio.

**Key words:** Nanoparticle, Ornaments, Human benefits, Nanotechnology.

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## 1. Introduction

Our life style has been playing an important role to the identification of our country for a long time. That includes food, dress, language and ornaments. Both in ancient and modern days, our ornaments have a variety of design and style so mostly people love to wear jewel. Ornaments are not only increased our affluence, women look majestic and eminence if they wore ornaments. It also help them in good concerning this, metal nanoparticles have been brilliantly used by our ancestors in ways. Its scientific knowledge has not reached present generation. This paper gives emphasis on role on nanoparticles in human life which is vital in health aspect.



## **2. History**

Historical evidence shows that the people of ancient ages wore metal ornaments for embellishment and showing their richness, to differentiate their civilization, to gain the medicinal property and also to protect them from some negative waves. Many people of various cultures wear jewellery on a daily basis and some jewellery can carry significant meaning and they are made from different metals and gems. Urban women use gold for their jewellery and rural folk used silver in large quantity. The ornaments made from zinc, tin, silver were common in tribal area. The most widely used metals are gold (Au) and silver because of its unchanging capacity and it can be inherited to their generation as an asset. Panchalogram is a composition of five metal such as copper (Cu), lead (Pb), tin (Sn), silver (Ag), zinc (Zn) mostly used to make idols and ornaments. Nano-materials were used as biomedical purpose in ancient ages. Thousands of years later, in the 11<sup>th</sup> to 13<sup>th</sup> centuries C.E., the Crusaders encountered unusually strong and sharp sword blades when then fought against Muslims. Part of the reason for the exceptional strength, remarkable sharpness, and beautiful patterns on the surface of the Damascus steel sword blades used by Saladin's troops may have been the presence of carbon nanotubes in the steel used. Scientists looking at such sword blades under the electron microscope have seen evidence of carbon nanotubes (and other Nano-materials) in Damascus steel. The medieval stained glass artisans were used gold nanoparticles in the glass matrix for producing ruby red colour and also they trapped silver nanoparticles for producing deep yellow colour.

## **3. Benefits of metal Ornaments in human life**

### ***3.1 Ring***

Ring finger has a nerve which connects to heart through brain so when we wear a ring in that finger it will stimulate our circulatory and nervous system.

### ***3.2 Ear ring***

Ear is a main part of our body which regulates our body temperature. Ear lobe has a main nerve which is connected to the three main parts of our inner organs such as kidney, brain, cervical region.

### ***3.3 Bangles***

Our wrist has a nerve, which shows our pulse rate. When we wear bangle it will induce our blood circulation. In ancient age people wore bangle in both hands.

### ***3.4 Armlet***

The armbands help to the blood circulation in arms and given a resistance to make arm comfortable.

### ***3.5 Nose Ring***

It is one of the compulsory ornaments as per hindu traditional and it has its own scientific advantage. It helps to breathe regularly and comfortably, nose piercing increases the beauty and also protects them from all nasal infections.

### ***3.6 Necklace / Chain***

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It makes women more beautiful and charming. All Indian married women wore this and it help to regularize our blood circulation.

### **3.7 Anklets**

It is made by silver and women wore it in ankle. Silver is a very good conductor of energy and work as a mediator between the two forms of energy such as earth and human body. It gives more energy to women and sends negative energy to earth.

### **3.8 Toe ring**

It is a traditional Indian ornament. Only married women wore this in their second toe of both foot and it will regularize the menstrual cycle.

Above mention the ornaments are mostly made by silver, gold, copper, iron and zinc. Adorn with ornaments that will enhance our beauty and also getting benefits from the acupressure healing treatment. It may help to remain healthy. The metals have electromagnetic properties and the ionic forces can interact to alter the blood flow and energy level, facilitate to healing of joints, muscle, bone and static magnets are being to help heal wounds.

## **4. Other benefits of metal Nanoparticle**

In ancient ages our people mostly used utensils made from copper and bronze for cooking so they consumed little bit amount of these metals. Since ancient times the copper has been used to promote health in various ways. It is a good medicine for sore throat, eye and skin infection and also applied to wounds to prevent infections. It plays an important role in metabolic functions of all plants and animals. RDA said that the daily consumption of copper in an adult human is 0.9 mg and it will increase our immunity, bone strength and support the function of heart and cardiovascular system. People belief that the Panchalogam will bring balance to their body, mind and also increase their self-confidence; improve their good health, fortune, prosperity and peace of mind. During the deity work ship the resultant product after the abishegam contains the metals in trace amount which reached from the idols. Gold nano-cystallites in the form of colloidal gold were used as drugs by several Asians in the early 2500 BC. Reports also suggest that colloidal gold namely “Swarna Bhasma” and “Makaradhwaja” are still in use in Indian traditional medicine called the “Ayurveda” that dates back to first millennium BC. During the sixteenth century in Europe, colloidal gold named as “Aurum Potabile (drinkable gold)” was believed to have curable properties to several diseases (Suresh *et al.*, 2010). Olden times, Sidhas prepared medicine from metals and they were converted by them into medicinal compounds of high potency. Gold also has a long history of use in the western world as nervine, a substance that could revitalize people suffering from nervous conditions. In the 16<sup>th</sup> century gold was recommended for the treatment of epilepsy and beginning of the 19<sup>th</sup> century it was used in the treatment of syphilis. Following the discovery of the bacteriostatic effect of gold cyanide towards the tubercle bacillus by Robert Koch and the gold based therapy for tuberculosis was introduced in 1920 (Shaw *et al.*, 1999). Swarna Bhasma (gold particles) was used in Ayurvedic



medicine for curing some diseases such as infertility, general debility, muscular weakness, sexual weakness in men and frigidity in women, asthma, heart conditions and nervous disorders, arthritis of all types especially rheumatoid arthritis and also the Silver Bhasma (silver particles) were used to cure chronic blood pressure (Vijay *et al.*, 2012). Swarna Bhasma particle having the ability to open the tight junctions our cells because that size is less than 58 nm so it was easily absorbed by small intestine and it can reach the affected site by oral administration via and it can possibly to release the Au ions (Willi *et al.*, 2012). Silver compounds have been used to treat burns, wounds and infections (Dunn *et al.*, 2004). Ag nanoparticles are a safe and stable preservative, and that they are effective against a broad spectrum of microorganisms. Ag ions and Ag-based compounds have strong antimicrobial effects (Satoshi *et al.*, 2010). Kalimuthu *et al.*, (2010) reported that the AgNO<sub>3</sub> having anti fungal activity, anti inflammatory effect, anti angiogenesis activity and anti platelet activity. Antiviral activities against HIV-1 at non-cytotoxic concentrations have been proved (Lara *et al.*, 2010) and broad spectrum against several pathogens so they are increasingly incorporated into various matrices to extend their utility in materials and biomedical applications (Sarkar *et al.*, 2007). Ramamurthy *et al.*, (2013) prepared stable green synthesis of Ag and Au nanoparticles from *Solanum torvum* aqueous fruit extract and it is used for the treating several oxidative stress diseases and controlling various human and veterinary infections. In modern medicine gold nanoparticle find significant application in drug delivery as they are capable of encapsulating active drugs and targeting specific site (Rathore *et al.*, 2013). They are used in health related products such as bandages, catheters, and other materials to prevent infection, particularly during the healing of wounds and burns. They are currently being added to many common household products such as bedding, washers, water purification systems, tooth paste, shampoo, fabrics, deodorants, filters, paints, kitchen utensils, toys, and humidifiers to impart antimicrobial properties (Baker *et al.*, 2005). TiO<sub>2</sub> photo catalysts can be used as effective bio film disinfectant in food processing industries (wolfrum *et al.*, 2002). Nanoparticles of titanium dioxide are used in cosmetics, filters that exhibit strong germicidal properties and remove odours, and in conjunction with silver as an antimicrobial agent. Moreover, due to the photo catalytic activity, it has been used in waste water treatment. It is considered non-toxic and has been approved by the American Food and Drug Administration (FDA) for use in human food, drugs, cosmetics, food and contact materials (wist *et al.*, 2004). CuO is cheaper than silver, easily mixes with polymers (Xu *et al.*, 1999) and relatively stable in terms of both chemical and physical properties and these nanoparticles were effective in killing a range of bacterial pathogens involved in hospital-acquired infections (Ren *et al.*, 2009). Zinc oxide (ZnO) and copper oxide nanomaterials are being incorporated into a variety of medical and skin coatings due to their antimicrobial property. ZnO nanoparticles are used in the wallpapers in hospitals as antimicrobials. ZnO powder is an active ingredient for dermatological applications in creams, lotions and ointments on account of its antibacterial properties (Martinez *et al.*, 2003). Nanoparticles are improved the drug delivery process which involved anticancer drugs, anti inflammatory drugs (Henry *et al.*, 1987), nucleic acids, DNA fragment genes (Bertling *et al.*, 1991) and the treatment of AIDS (Lobenber *et al.*, 1996). The five metals are present in human body and some people lack some of these



components and the wearing of these metal ornaments will help to fulfil the need and also given stability and positive thinking.

## 5. Conclusion

India is a holy country. The country has many ritual and practices followed even from BCs. Now-a-days those practices and rituals associated with spiritual believes are proved to have scientific benefits. Like many other skills, if the scientific principles were taught to people it might have lost or occurred changes in due course of time. That may be the reason, why scientific benefits were introduced into spiritual believes. Many of them are practiced even today without knowing the scientific benefits and principles behind. Many such practices have been lost already as superstitions and myths. Usage of metals in rituals and wearing them has many powerful health and environmental benefits. Unaware about the benefits, people used it to exhibit their wealth and status alone. Recent researches have started revealing the beneficial properties of metal nanoparticles by absorption, ingestion and contact. Fashion and trend has made the youngsters avoid wearing beneficial metal ornaments totally. That was the reason why metal nanoparticles usage was not taught directly and made to be beneficial through rituals. Even though science behind is proved people had moved away from the reality. Education only can fill the gap between the culture and young generation minds.

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