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Research Article

Effect of Nanosilver Particles on Human Blood, Biochemistry Study in Vitro Condition

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Abstract

Nano silver is widely used in medical equipment, especially in the immune system and liver cells in the body . This study has examined the effects of nanosilver particles on the blood properties. The experimental study was conducted on six healthy donner . Blood samples was treated with volume ratio of nano silver colloidal (ml) with concentration (0.63) ppm injected to blood samples . Then the blood urea, blood crentinine; and alkaline phosphates where examined. Biochemistry result analysis obtained to treated blood samples and compared with control sample . The injection of nanosilver particles on blood (serum) has great effect and plag as induceation to the liver and kidney condition.

Keywords: *Immune system, blood crentinine, Biochemistry*

Introduction

Pure silver has the highest coefficient of electrical emission and thermal transfer to other metals. Colloidal silver was first used by lee in 1889 for medical use, [Guan ZZ, 1991]. In the old times, silver was used in world war 1 for wound dressing as disinfectant, but, penicillin was substituted after wards. Nowadays, the use of nano silver particles can be seen around the world in various sciences; especially in medicine. [Eisler R, 1996]. The use of nanotechnologes, for example, experts do not have enough information on whether nanosilver particles have destructive effects on tissue and cells of flesh. Various toxins and nanoparticles may change body immune system and blood cells using which may have disadvantages for the body. Considering that most toxins in the body enter the liver for detoxification, this study investigated effect of nanosilver on blood serum that related to liver and kidney enzyme changes. According to blood changes after injection of nanosilver particles. The first step in detecting liver, damage is to conduct a simple blood test that indicates the presence of certain liver or kidney enzymes. A under normal conditions; the enzyme are within the liver cells, but when liver is damaged, these enzymes enter blood stream. The most sensitive and most common liver diagnostic enzymes are alanine amino transferees [Honk. Martin TG. *et al*, 2002]. This study has examined the physiological effects of nanosilver particles on the change of blood properties test. Given the importance and novelty of studies on nano biotechnology and considering the effects of diameter and size distribution of nanoparticles on their properties. This study used the first generation of nanosilver particles as colloidal spherical AgNs and with a mean diameter of (20-40)nm for injection human blood [Lagaron JM. *Et al*, 2005].

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Material and methods

This experimental study was performed on 6 donner male health adult. Blood samples and control one where labeled and tested before and after nano silver particles injection to blood urea, blood crentinine; and alkaline phosphate tests using uv-vis spectrophotometer (sp – 3000 optima – plus-chapan). Blood sample separated to two levels, once red color upper level while yellow color serum level lower level. test for both levels have been established after injection of 0.1 ml (volume ratio) was added in addition to original sample. Tables (1,2,3) show the results of each test to six blood samples.

Table 1: Blood Urea test result

Sample no.	B. Urea before AgNs injection	B. Urea after AgNs injection upper level	B. Urea after AgNs injection lower level
B1	50.8	27	49
B2	37.7	26	36.3
B3	28	14	27
B4	46	31	44
B5	31	21	31
B6	31	23	29

Table 2: Blood crentinine test result

Sample no.	B. Crentinine before AgNs injection	B. Crentinine after AgNs injection upper level	B. Crentinine after AgNs injection lower level
B1	1.27	0.67	1.22
B2	0.94	0.65	0.90
B3	0.7	0.3	0.7
B4	1.1	0.7	1.1
B5	0.7	0.5	0.7
B6	0.7	0.5	0.7

Table 3: Alkaline phosphates test result

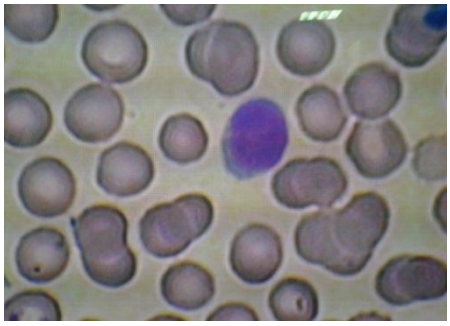
Sample no.	A. Phos. before AgNs injection	A. Phos. after AgNs injection upper level	A. Phos. after AgNs injection lower level
B1	8.2	10.7	8.4
B2	15.1	11.4	14.6
B3	9	8	9
B4	10	7	10
B5	18	14	18
B6	9	6	9

These groups (B1-B6) included control sample that identical to the treated sample for comparison method. Nanosilver particles with concentration (0.63) ppm was injected to the second group (B-B6). serum concentration was measured by biochemical spectro photometer and biochemical kits. The Urean, Alkaline phosphate and blood crentinine were measured. Nanosilver colloidal was prepared by laser ablation technique (LAT) method with yellow color colloidal have size distribution (20 -40) nm.

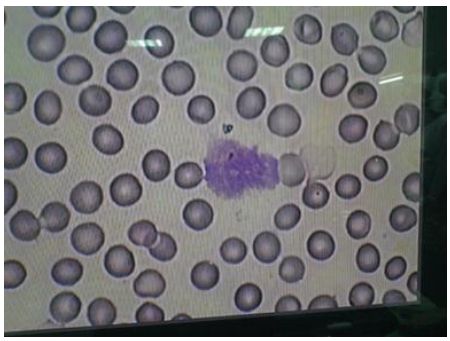
Result and Discussion

The interactions of silver nanoparticles with bio system are just beginning to be understood, and these particles are increasingly being used as microbedial agents.

Nanotechnology involves the tailoring of materials at atomic level to attain unique properties, which can be suitable manipulated for the desired applications [Baker. C., *et al*, 2005]. The new age drugs are nanopaticles which can fight human pathogens [Sastry, *et al*, 1998]. In recent years, extension studies have been undertaken on the use of antimicrobial properties of silver, incorporated within medical devices [Rajaretinam Raiesh Kannan, *et al*, 2011].Table (1,2,3) shows the average value of urea, phosphate and crentinine blood test results for 6 blood human samples for two kind of blood lever. The upper level represent red cells group while the lower level represent yellow serum blood level from test results its seens that the effect of nanosilver particles was effected oppositely on upper level of blood sample (red one). There is no effect on the lower lever (yellow, serum) level. The reduction of the urean, alkaline phosphate; and blood crentinine could be related to the aggregation effect of nanosilver particles to blood cells. Fig. (1) shows the aggregation effect of nanosilver particles within the blood cells which cause the reduction of parameters that relected to the liver kidney parameters.



(1)



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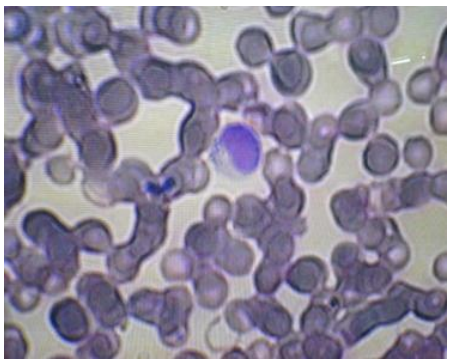

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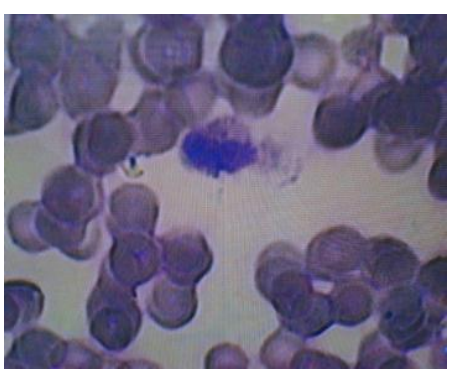

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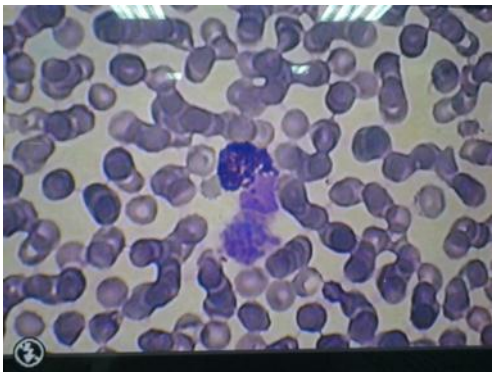

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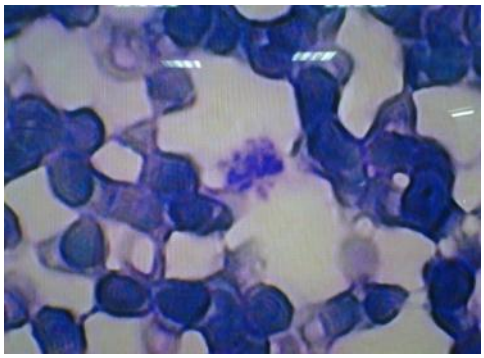

(6)

Fig.1: Effect of Colloidal Silver (AgNs) on PLT, WRC and RBC in vitro application

Conclusion

In the present study, physiological effects of nanosilver particles have been evaluated at (0.63) ppm concentration with (0.1) ml volume ratio of colloidal nano silver injected to human blood samples and evaluated. Results show reduction of urea, blood crentinine and alkaline phosphate values.

The change in these parameters is related to the fed or the activity of nanosilver particles on blood that prove the important role of nanosilver additives to the physiological change in human body. The wide use of different nanosilver particles in the whole word, requires more accurate and comprehensive studies on the effects of these nanoparticles on blood cells. In vitro condition and various treatment methods and nanoparticles with different combinations and diameters present new horizons for farther research to investigate applications of nanotechnology in physiology.

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