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參展科別 生物化學

作品名稱 **A New Generation Colorimetric Method for Lead Analysis: APTAMER MODIFIED GOLD NANOPARTICLES**

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ABSTRACT

Lead is a toxic element which is used in the production of chemicals, dyes, accumulators and various industrial areas. It may cause complications even extended to death when it is taken consistently in high amounts. Lead poisoning is in the first place among the occupational diseases. It is gaining importance to develop new and sensitive methods for lead analysis. Because lead poisoning can progress without any symptoms and poisoning level (10μg/dL) is low. Disadvantages of the systems used for lead analysis are such as longer detection time, being expensive and difficult to implement.

The aim of this project is to develop a new generation method in order to detect lead in blood, based on aptamer modified gold nanoparticles. We detected the lead in terms of color change obtained in gold nanoparticle solutions, with composite biochemosensor that is prepared with 20 & 80 nm sized gold nanoparticles and TBA(Thrombin Binding Aptamer). While immobilizing TBA to the gold nanoparticles, we benefitted from the magnificent surface affinity of the –SH (Thiol) groups that modified to the TBA. Gold nanoparticles that are used in development of our biotechnological method do not stimulate the immune system. The preparation of aptamers in completely sterile medium provides us to use our system in the lead detection of blood. Our method can also be used in the lead detection of mediums such as waste water, food and soil.

We have developed a biochemosensor that can be used to detect the presence and absence of Pb^{2+} by taking into consideration the toxic effect in the human body. Also we detected the presence of lead colorimetrically, in low concentration levels and wide interval values of 4.4 – 11 μg/dL.

The developed system is first that; it provides TBA to be used with its complimentary sequence detects the presence of lead colorimetrically and can be used in physiological media such as blood.

Also our system can detect lead in amounts that are lower than the poisoning threshold.

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The author have developed a biochemosensor that can be used to detect Pb^{2+}.

The detect method is based on Aptamer modified gold nanoparticles. The sensitivity of this method seems higher than other detection menthols.