Comunicado 201
Ciudad de México, 17 de octubre de 2021

IPN develops a colloidal biosensor to diagnose early-stage acute kidney damage

- **This development can be a valuable tool for diagnosis, as it is fast, economical and effective**
- **"The achievement of this research is due to the vocation and taste for science, which is key to the achievement of results": Delfina Gomez Alvarez**
- **The IPN´s General Director has highlighted that the pillars for the generation of this knowledge are the Higher Education Institutions**

Researchers from the National Polytechnic Institute (IPN) seek to reduce the rates of Acute Kidney Damage (DRA), through the development of a colloidal biosensor from gold nanoparticles coupled to an antibody for the detection of molecular markers, which allows a diagnosis in the initial phase of this condition.

The achievement of this research is due to the vocation for science, which is key to the achievement of results, as pointed out by the Secretary of Public Education, Delfina Gomez Alvarez.

In turn, the IPN´s General Director, Arturo Reyes Sandoval, stressed that the pillars for the generation of this knowledge are the Institutions of Higher Education and for the capacity they have to do science they can make great contributions to society.

Dr. Marlon Rojas Lopez, head of the project carried out at the Center for Research in Applied Biotechnology (CIBA) Tlaxcala, pointed out that, unlike the studies that are usually done to detect DRA, the polytechnic biosensor does not seek to measure the levels of serum creatinine (a waste product of muscle activity, whose accumulation in the blood indicates inadequate filtration of the kidneys), but specific molecules such as Cystatin C and Kim-1, expressed in urine long before creatinine.

He stressed that "by the nanometer scale of the biological sensor, only a drop of it -composed of about 3 trillion nanoparticles- is put in contact with a drop of urine, it is stirred, it is left to rest five or 10 minutes so that the molecules to be detected interact with the biosensor and then a revealing is made, that is, we observed the result using spectroscopic techniques," he said.

In this regard, the polytechnic scientist attached to the National System of Researchers (SNI) Level II said that, due to its characteristics, this biological sensor can be a valuable tool for diagnosis, since it is fast, economical and effective. "It could be a good alternative to detect DRA, since it is not invasive, very little biosensor is required and therefore it´s economical, in addition to the granted that almost all clinical laboratories have a visible or infrared UV spectrometer to interpret the test," he added.

The expert in the development of biosensors mentioned that the origin of DRA is multifactorial, but the first causes are chronic-degenerative diseases, such as diabetes or hypertension; diseases such as lupus or cancer, but it can also be caused by environmental factors such as exposure to pollutants.

He said that, in collaboration with the scientist of the Department of Toxicology of the Center for Research and Advanced Studies (Cinvestav) of the IPN, Dr. Olivier Christophe Barbier, they used the biosensor to perform tests with urine samples from infants with lupus and cancer, in which concentrations of markers such as Cystatin C were detected.

Dr. Rojas Lopez reported that due to the contribution that the nanobiosensor represents for clinical diagnosis, it will be sought to patent it and thus have the possibility of making it available to the health sector to help avoid the complications of Acute Kidney Damage, which, if not detected in time, can evolve to Chronic Kidney Damage and lead the patient to dialysis, to hemodialysis, transplantation or even death.

--o0o--