

Researchers develop biosensor to screen fetal Down's Syndrome

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Due to educational, social and economic reasons, more and more women are delaying childbirth. However, advanced maternal age is associated with several adverse pregnancy outcomes, and in particular a high risk of Down's syndrome (DS). Hence, it is increasingly important to be able to detect the genetic disorder- fetal Down's syndrome (FDS).

Researchers at the National Taiwan Normal University developed an effective, highly sensitive, surface plasmon resonance (SPR) biosensor with biochemically amplified responses using carboxyl-molybdenum disulfide (MoS_2) film.

The use of carboxylic acid as a surface modifier of MoS_2 promoted dispersion and formed specific three-dimensional coordination sites. The carboxylic acid immobilized unmodified antibodies in a way that enhanced the bioaffinity of MoS_2 and preserved biorecognition properties of the SPR sensor surface.

Complete antigen pregnancy-associated plasma protein-A2 (PAPP-A2) conjugated with the carboxyl- MoS_2 -modified gold chip to amplify the signal and improve detection sensitivity.

This heterostructure interface had a high work function, and thus improved the efficiency of the electric field energy of the surface plasmon. These results provide evidence that the interface electric field improved performance of the SPR biosensor.

Researchers hope that this technology will be investigated in diverse clinical trials and in real case applications for screening and early diagnosis in the future.