Dynamic system for rapid cystinuria diagnosis

CSIC has developed a technology for the precise and early diagnosis of cystinuria disease, through urine testing. It is based on molecular networks to produce a fluorescent measurable signal when some substances are linked to a cysteine or cystine.

Industrial partners from the diagnostic or pharmaceutical industry are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing

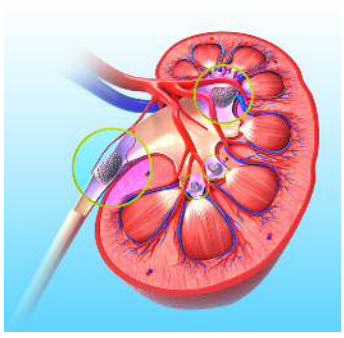
Dynamic sensing network based on disulfide exchange

Cystinuria is a rare congenital disease, affecting 1 in 7000 people. It is caused by the excess of cystine in the urine, which triggers the formation of stones or crystals in kidneys, ureters and bladder, as well as pain in the affected areas.

Among the current methods for diagnosis, the most common are the collection of stones for microscopic examination and the Brand test (cyanide-nitroprusside), which detects cystine excretion, but it is not specific enough as it can result in false positives due to the presence of other sulphur molecules or drugs, such as when patients are receiving a treatment of *N*-acetylcysteine, a usual mucolytic. More sophisticated methods are based on genetic tests which enable an early diagnosis but they are much more expensive.

The technology presented allows the early detection of cysteine and cystine present in urine by means of a cheap and reliable assay. The test is based on a dynamic system in which its components rearrange adequately in the presence of these amino acids, leading to a readable fluorescent entity.

This method may be applied to the early diagnosis of cystinuria and other diseases related to an abnormal cystine storage.



Cystine stones in kidney and the ureter.

Main innovations and advantages

The main features of this test are:

- The sensor allows detecting cysteine in its reduced (Cys) or oxidized (cystine) forms without extra preparation steps.
- High selectivity against other biothiols such as homocistine, glutathione or *N*-acetylcysteine present in urine, overcoming false positives.
- Sensitivity. No interference with other typical amino acids present in urine samples.
- Detection range: 50 µM - 1 mM. Stone-producing cystinuria starts from 0.8 mM Cys in urine.
- Inexpensive, rapid (ca. 1 hour) and feasible test based on fluorescence reading.

Patent Status

Spanish patent application filed

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