Poster

Glutathione detection using a fluorescence prove based on porphyrin-Hg complex

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ABSTRACT

Glutathione (GSH) is an abundant tripeptide found in the almost all cells. GSH is relevant as antioxidant and in regulation of some carcinogenic mechanims. It's well known that disturbances in GSH homeostasis could unleash a cancer disease. Therefore, its necessary GSH effective proves to prevent future physiological alterations due to a decrease or increase of the tripectide concentrations. Herein, we report a turn-on fluorecence sensor based on a highly fluoresncence porphyrin derivated (chlorin) complexed with Hg (II).

Methods: To study the formation of Hg(II)-Chlorine complex, a different concentrations of a mercury cloride (II) solution was added to a fixed concentration of chlorine and fitting to the Stern-Volmer ecuation. To study the response to glutathione, a certain ratio of Hg(II):Chlorine was exposed to increasing amounts of GSH. To determain the limit of detection (LOD), a quarter of the maximun slope of the curve is calculated for each sample.

Results: Chlorine coordinates adequately to mercury producing a quenching according to the Stern-Volmer equation. For the determination of glutathione in water, a pH of 7.4 (physiological pH) was maintained and increasing amounts of glutathione were introduced for a fixed ratio of mercury-chlorine complex. At increasing amounts of glutathione, it is coordinated with mercury and releasing chlorine, resulting in an increase in fluorescence due to free chlorine. The response curve is sigmoidal in shape as glutathione first complexes with free mercury, and once this is depleted, GSH captures the mercury complexed to chlorine, producing the increase in fluorescence mentioned above.

This experiment was repeated for different mercury:chlorine ratios (2:1, 5:1 and 10:1) with the 2:1 ratio having a lower detection limit of 0.01 uM. It is now intended to transfer this system to a titanium dioxide based film.

REFERENCES

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