Noninvasive gut inflammation detector

Thiosulfate and tetrathionate are two kinds of chemical compound which would be produced during gut inflammation[[1]](#footnote-1). Although the detailed process and reason for producing them is still unknown, scientists already concluded that the level of thiosulfate and tetrathionate production is directly proportional to the seriousness of gut inflammation[[2]](#footnote-2). Thus, these two molecules became our target for gut inflammation detection. \_\_\_可能需要补一张机理图，王宣 two-component system

Until now, scientists are able to detect thiosulfate and tetrathionate using utilized two-component system detector, which includes two parts: detector and reporter. This two-component system detector was gained from marine *Shewanella* species, and previous experiments about gut inflammation detection had used sfGFP to show the result. But we thought this method can be further improved.\_\_\_补充gfp在缺氧下情况的文献，王宣。

SHSBNU\_China team worked on changing the reporter part to let the results be shown more clearly and visibly, not requiring specially-produced ultraviolet light nor the long time contact with oxygen. For our bacteria produced, the *E.coli* would produce chromo-protein[[3]](#footnote-3)\_\_\_引用2处内容：2012uppsala大学的项目（季），chromoprotein的文章（王宣） to change into a different color (even in anaerobic environment). Furthermore, to enable the result to be observed more clearly and easily, we had planned to produce a kind of pill, where the *E.coli* is stored, with special walls that would only allow small molecules to get through (like thiosulfate and tetrathionate molecules)\_\_\_补充细节，李帛轩. Furthermore, despite the normal chromo-proteins can it produce, we designed and produced still another plasmid using violacein in result showing. Violacein can also be produced and show obvious purple color in anaerobic condition, and the special reason for choosing it is that this protein can cure or slow down the inflammation to some degree. [[4]](#footnote-4)

This two-component system detector and our project have some potential that it can be further modified to give more treatments while detecting. We also came up with solutions to reduce potential risk in practical treatments; for example, we have the thought of creating kill switches, using DNase to destroy the engineered gene to protect the other bacteria in pati

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