

**A genetically encoded probe for monitoring and detection of iron in real-time**

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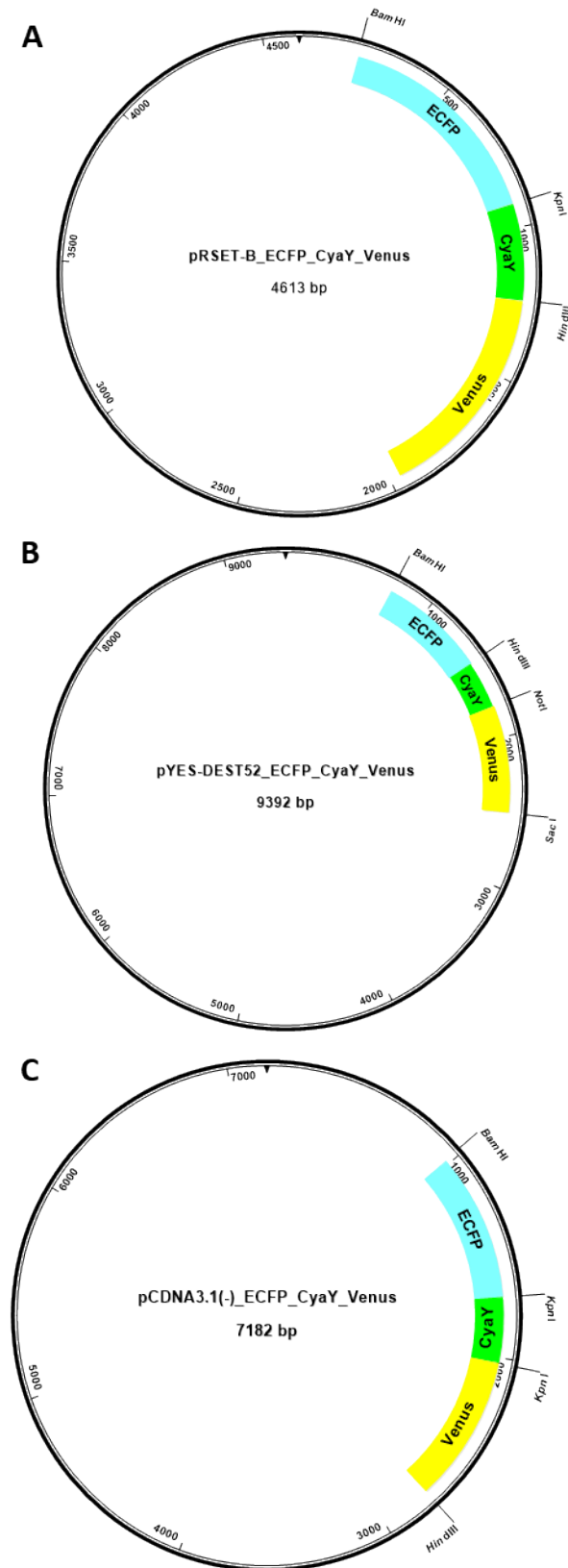
Phone no: +91-(11)26981717

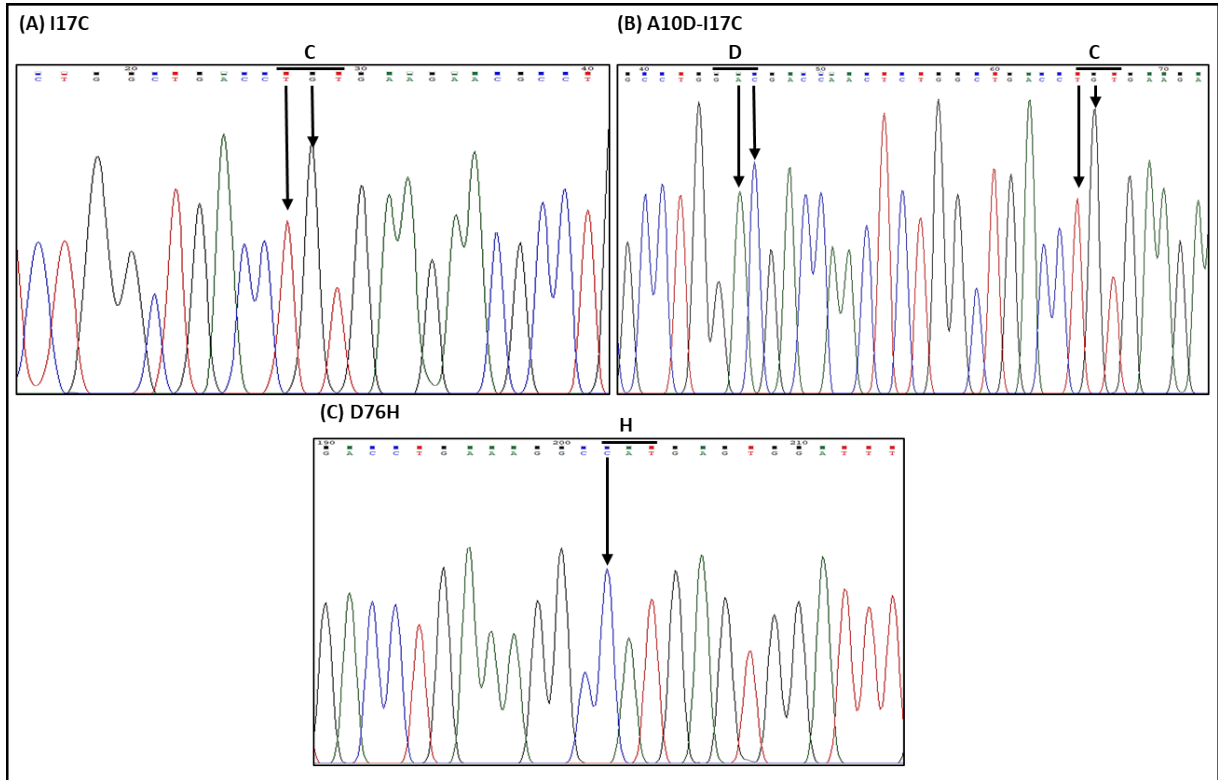
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**Fig. S1** SocA sequence alignment analysis: comparing the original sequence with obtained results.

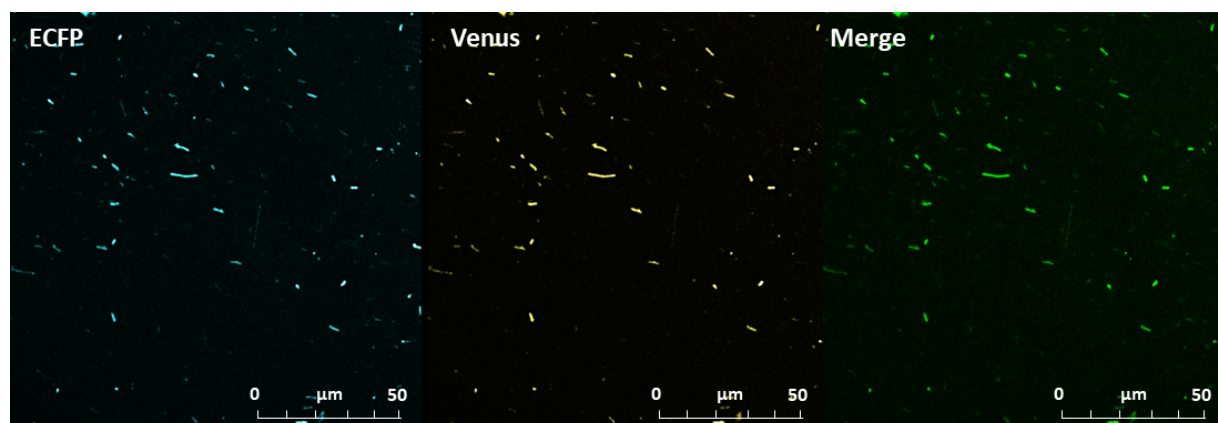
| Score         | Expect                                                        | Identities    | Gaps      | Strand    |
|---------------|---------------------------------------------------------------|---------------|-----------|-----------|
| 582 bits(315) | 3e-171                                                        | 315/315(100%) | 0/315(0%) | Plus/Plus |
| Query 1       | ATGAACGACAGTGAATTTTCATCGCCTGGCTGATCAACTCTGGCTGACCATTGAAGAACGC | 60            |           |           |
| Sbjct 1       | ATGAACGACAGTGAATTTTCATCGCCTGGCTGATCAACTCTGGCTGACCATTGAAGAACGC | 60            |           |           |
| Query 61      | CTGGACGACTGGGATGGCGACAGCGATATCGACTGCGAAATCAACGGCGGCGTACTGACC  | 120           |           |           |
| Sbjct 61      | CTGGACGACTGGGATGGCGACAGCGATATCGACTGCGAAATCAACGGCGGCGTACTGACC  | 120           |           |           |
| Query 121     | ATTACCTTTGAGAATGGCAGCAAAATCATTATCAACCGCCAGGAGCCGCTGCACCAGGTA  | 180           |           |           |
| Sbjct 121     | ATTACCTTTGAGAATGGCAGCAAAATCATTATCAACCGCCAGGAGCCGCTGCACCAGGTA  | 180           |           |           |
| Query 181     | TGGCTGGCAACCAACAGGGCGGCTACCATTTTGACCTGAAAGGCGATGAGTGGATTTGT   | 240           |           |           |
| Sbjct 181     | TGGCTGGCAACCAACAGGGCGGCTACCATTTTGACCTGAAAGGCGATGAGTGGATTTGT   | 240           |           |           |
| Query 241     | GATCGCAGCGGCGAAACCTTCTGGGATTTGCTGGAACAGGCGGCGACGACGAGGCGGGT   | 300           |           |           |
| Sbjct 241     | GATCGCAGCGGCGAAACCTTCTGGGATTTGCTGGAACAGGCGGCGACGACGAGGCGGGT   | 300           |           |           |
| Query 301     | GAAACAGTCAGTTTC                                               | 315           |           |           |
| Sbjct 301     | GAAACAGTCAGTTTC                                               | 315           |           |           |

**Fig. S2** Designing of nanosensor constructs in different expression vectors (pRSET-B, pYEST-DEST52, pCDNA3.1(-)) to facilitate cellular expression in *E. coli*, *S. cerevisiae*, and HEK-293T cells.

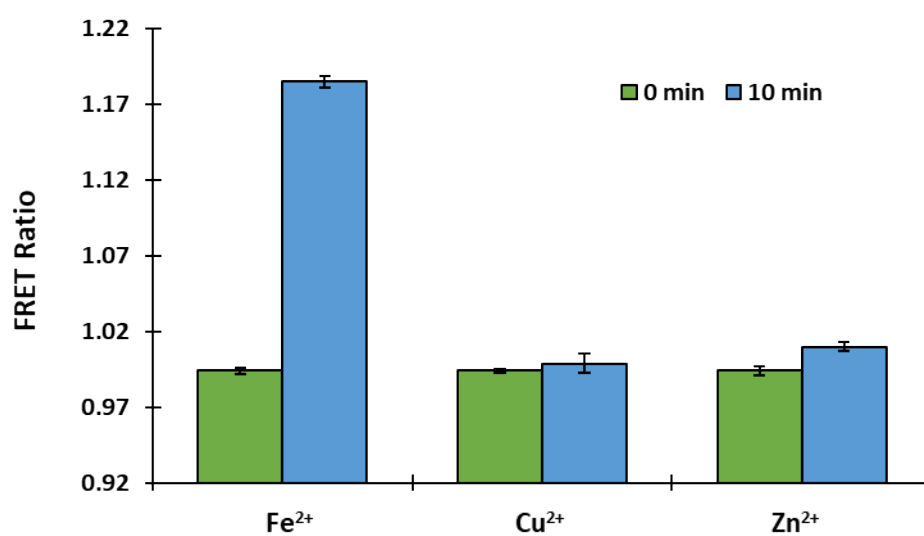




**Fig. S4** Confocal microscopy image demonstrating efficient expression of the genetically encoded FeOS in bacterial cells.



**Fig. S5** FRET ratio changes recorded before and after incubation of yeast cell with metal ions for 10 minutes.



**Fig. S5** FRET ratio changes recorded before and after incubation of HEK cell with metal ions for 10 minutes.

