

“Frontiers in Science” Seminar (Chemistry 5)

Prof. Sheikh Muhammad Ibrahim

Najran University, Saudi Arabia

Title : Engineered Cytochrome proteins: Past, present and the future

Date & Time : October 29, 2025, 16:00~17:00

Venue : G101 Science Hall



Abstract: Cytochrome c_{552} from *Thermus thermophilus* is one of the fascinating functional proteins that emerged as one of the key proteins engineered for the construction of biocatalyst, bioelectrical device, energy conversion etc. thanks to its extreme thermal stability and electron transfer properties; albeit limited because it's non-removable heme species. A series of biochemical techniques were undertaken to flip its negative into positive aspect. That resulted in a series of novel engineered cytochrome proteins where we developed a tweaking in the amino acid chain for selective replacement of original heme with artificial group into its more versatile scaffold. Additionally, in vitro biosynthetic click reaction approaches were performed that enabled a careful advancement in non-removable nature of artificial groups enhancing its durability. Switch on and off a cysteine amino acid residue plays a crucial role that enables tethering of the active artificial groups. The engineered protein shows potential binding site for drugs and therefore can be used as nano carriers. A careful modification of the side chain of the protein scaffold will enable a selective recognition of cancer cells followed by targeted drug delivery to kill them.



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