Contribution ID : **75** Type : **Poster**

High frequency Electromagnetic Field (HF-EMF) induced pGLO plasmid DNA uptake in E. coli

There is a growing body of evidence suggesting that treatments using certain types of Electromagnetic fields (EMF) aid the heading of surface wounds and skin lesions, promote bone regeneration after fractures and reduce pain and swelling after surgery. The underlying molecular mechanisms by which exposure to EMF induces these favorable medical outcomes are not yet understood. Of the possible biological targets of EMFs, the cell plasma membrane has been identified as one of the most promising.

Previously, we demonstrated that exposure of E.coli JM 109 cells to 18 GHz EMF produced increased cell permeabilization and genetic transformation of E. coli using the pGLO DNA. The permeabilisation and genetic transformation of E.coli using synchrotron THz radiation is currently under investigation. THz frequencies have 100 times energy per photon compared to the GHz radiation. If a similar effect to the 18 GHz is noted, then a method of tailoring the exposure depth can achieved. Since the absorption coefficient of water changes from ~2.5/cm at 18 GHz to ~1000/cm at 10 THz., the penetration depth of the treatment could be controlled by choosing the appropriate radiation frequency.

While the application of EMF appears to be safe, effective, minimally invasive, highly focused, and also reproducible, titratable and can be used in both in vitro and in vivo, it is essential to understand the underlying mechanism of action. As a step towards this understanding, we are investigating the mechanism by which the bacterial cell interacts with plasmid DNA in the presence of EMFs.

Level of Expertise

Early Career <5 years

Presenter Gender

Woman

Pronouns

Do you intend to attend UM2022

In person - Melbourne

Students Only - if available would you be interested in student travel funding

Students Only – Do you wish to take part in the Student Poster Slam

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Yes

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