Effects of T-Consciousness Fields on the Growth and the Production of ATP in *Escherichia coli* BL21 under Microgravity and Earth's Gravity Conditions

Fateme Barancheshme[1], Mohammad Ali Taheri[2], Zahra Hajebrahimi[3], Sara Torabi[4], Farid Semsarha[5]

1- University of North Carolina at Charlotte, Charlotte, North Carolina, USA , 2- Cosmointel Inc., Vaughan, Ontario, Canada, 3- Aerospace and Biological Sciences, Tehran, Tehran, Iran, 4- College of sciences, University of Tehran, Tehran, Tehran, Iran, 5- Biochemistry and Biophysics Research Center, University of Tehran, Tehran, Tehran, Iran

Objective and Introduction

Objective

This study explores the effects of T-Consciousness Fields (TCFs) on *E. coli* growth and ATP production under microgravity (MG) and Earth's gravity (1G).

Role of Microorganisms

Microorganisms, including bacteria, are integral to Earth's biosphere, with a presence equivalent to human cells[1]. Their ubiquitous nature extends to space exploration, underscoring the need to comprehend their behavior in space habitation environments[2].

Adaptability to Extreme Conditions

Bacteria exhibit remarkable resilience, thriving in diverse conditions ranging from subzero temperatures (-15 ℃) to extreme heat (122 ℃)[3]. Given their capacity to develop altered phenotypes and metabolic activities for survival, assessing their ability to endure environmental stressors, including those encountered in space, is imperative[4].

Microgravity Effects on *E. coli*

E. coli, extensively studied as a model organism, displays significant physiological responses and gene expression modifications under microgravity conditions[5].

T-Consciousness Fields (TCFs)

Mohammad Ali Taheri introduced TCFs in the 1980s, proposing them as non-material/non-energetic elements with distinct functions within the Cosmic Consciousness Network (CCN). TCFs are hypothesized to affect all entities, including microorganisms, with practical applications across various domains[6].

Sciencefact and TCFs

Taheri introduced Sciencefact in 2020 as a branch of Erfan Keyhani Halqheh, focusing on scientific investigations to substantiate T-Consciousness as an irrefutable phenomenon. Sciencefact bridges scientific and consciousness studies by conducting reproducible laboratory experiments[6].

Material and Methods

TCFs Application

Three types of TCFs (1, 2 and 3) were applied on the *E. coli* BL21 strain as per COSMOintel protocols. Access to applying TCFs was through the free "Assign Announcement" section on the COSMOintel website. TCFs were applied continuously for 24 hours during the experiment.

This entire experiment was carried out using a double-blind method, with lab technicians unaware of TCF theory and the individual applying the treatment unaware of the study's details.

Material and Methods (cont.)

Measurement Parameters

E. coli's growth rate and ATP production were assessed under normal gravity (1G) and MG conditions. Growth rate was determined by optical density, while ATP production was measured through luciferase enzyme activity.

Experimental Groups [Four experimental groups (n=3)]

Group 1: MG + TCFs treatment
Group 2: MG without TCFs (control)
Group 3: 1G + TCFs treatment
Group 4: 1G without TCFs (control)

Clinostat Rotation

TCFs treatment was applied to the samples concurrently with clinostat rotation to simulate microgravity conditions.

Bacterial Growth and Sample Preparation

Escherichia coli strain BL21 was cultured in Luria-Bertani (LB) liquid medium. The bacterial stock was cultured in 5 ml LB liquid medium with 5 µl ampicillin and incubated until reaching a bacterial density of 0.2, monitored via optical density at 600 nm (OD600).

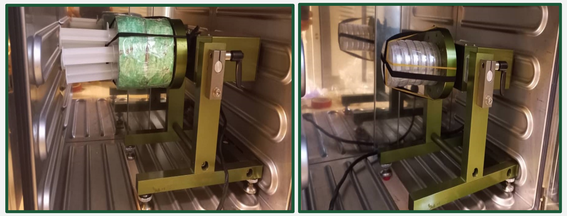
Microgravity (MG) Application:

Clinostat was utilized to provide a reliable replication of space experiments under real microgravity conditions.

Experimental Setup

- Six syringes and petri dishes are arranged in the clinostat.
- Three samples were subjected to TCFs for 24 hours.
- Rotational speed = 30 rpm for liquid mediums and 15 rpm for solid mediums

(Similar procedures were used with untreated samples as controls)

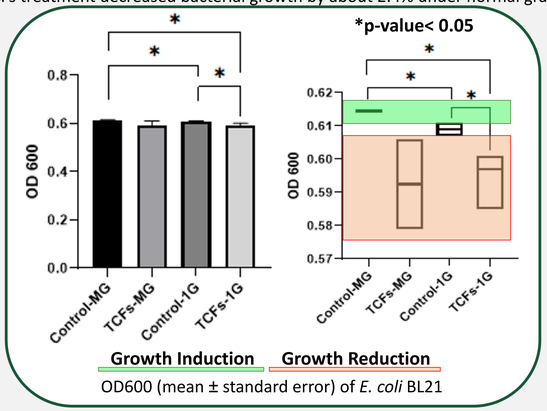


Lysis of bacterial cells

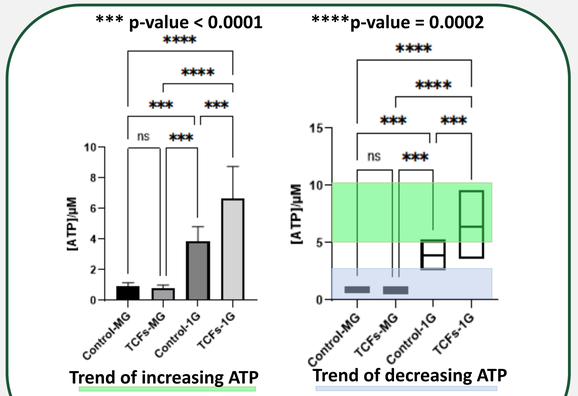
To measure the amount of ATP in the treated bacteria and control samples, in a 1:1:1 ratio of the dialyzed luciferase enzyme, luciferin, and bacteria lysis solution were mixed in a tube. The amount of light was expressed in RLU.s^{-1}.

Results and Discussion

- The growth of bacteria without the influence of TCFs (control) increased up to 1.4% compared to the earth's gravity, while there was no significant difference between TCFs-treated samples in MG and the control in 1G condition.
- TCFs treatment decreased bacterial growth by about 2.4% under normal gravity:



OD600 (mean ± standard error) of *E. coli* BL21



Comparison of TCF-treated samples with control in MG condition through box chart. Mini. Conc. of ATP= 0.585 µM

Results and Discussion

- MG stress reduced ATP production, resulting in 4 times lower ATP concentration in both samples compared to 1G controls.
- This result implies that this bacterial strain operates more efficiently under MG conditions. MG generally affects mitochondrial biological function, consequently causing the down-regulation of ATP production, oxidative phosphorylation, and mitochondrion respiratory chain components and the upregulation of ROS generation through the impaired respiratory chain[7].
- Under Earth's gravity, ATP concentration increased by 73% compared to 1G controls. Another experiment on the HEK-293 cell line reported an ATP production enhancement under these fields' influence.

Conclusion

This study confirmed the distinct effect of TCFs . These non-material and non-energetic fields have different influences on the behavior of *E. coli* under MG and 1G conditions. TCFs treatment inhibited the inducing effect of MG on bacterial growth and significantly increased the concentration of ATP in the 1G condition.

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