Effect of the Faradarmani Consciousness Field on the Susceptibility of Antibiotic-Resistant Human Pathogenic Bacteria *Pseudomonas aeruginosa*

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DOI https://doi.org/10.61450/joci.v1i3.25

Abstract

Faradarmani Consciousness Field is one of the several Taheri Consciousness Fields (TCFs) introduced by Mohammad Ali Taheri. TCFs do not possess a quantity, so we cannot directly measure them. However, their effects can be indirectly evaluated through laboratory experiments. The resistance of bacteria to antibiotics is a global challenge because the number of antibiotic-resistant bacterial strains has increased annually and spread worldwide. It seems novel approaches are needed to solve this problem. In this study, the effect of Faradarmani CF on the susceptibility of antibiotic-resistant *Pseudomonas aeruginosa*, a human opportunistic bacterial pathogen, was evaluated. Antibiotic susceptibility in the presence and absence of Faradarmani CF was assessed via the antimicrobial disk diffusion method. Afterward, it was used in RT-qPCR to evaluate the expression levels of the *MexA*, *MexB*, and *OprM* genes in a *P. aeruginosa* strain overexpressing the MexAB–OprM efflux pump. According to the disk diffusion test results, Faradarmani CF significantly decreased antibiotic resistance in *P. aeruginosa* ($p < 0.05$). The RNA expression levels of the MexB and *OprM* genes were decreased in the Faradarmani treatment group compared with the control group ($p < 0.05$). The RNA expression level of *MexA* decreased, but it was not significant ($p > 0.05$). We showed that the drug resistance of *P. aeruginosa* decreased under the influence of Faradarmani CF, and that this effect can be examined *in vivo* in *P. aeruginosa* infections and in clinical studies. In addition, it is recommended that the impact of TCFs on other drug-resistant pathogens be investigated.

Keywords: Faradarmani Consciousness Field, Taheri Consciousness Fields, Cosmic Consciousness Network, *Pseudomonas aeruginosa,* antibiotic resistance

Introduction

Bacterial resistance to antibiotics is skyrocketing. It is one of the major problems in treating infectious patients, and finding a solution seems vital (Mendelson et al., 2015). *Pseudomonas aeruginosa,* as an opportunistic pathogen, is renowned for its outstanding adaptation to different environments. Diseases associated with this bacterium range from mild folliculitis to life-threatening pneumonia and septicemia (Mesaros et al., 2007). Decreased susceptibility to antibiotics and disinfectants has been extensively reported in clinical isolates, making infection with *P. aeruginosa* difficult to treat (Willcox, 2011; Abidi et al., 2013; Mohammadinia et al., 2012). One of the most prominent mechanisms underlying this resistance is the activity of efflux pumps belonging to the Resistance-Nodulation-Division (RND) family. Among these, the MexAB-OprM efflux system plays a central role in multidrug resistance. This tripartite complex consists of MexB, the inner membrane transporter that actively recognizes and expels a broad spectrum of antibiotics; OprM, the outer membrane channel that provides the exit pathway for substrates; and MexA, the periplasmic adaptor protein that stabilizes the assembly by bridging MexB and OprM. Together, these components form a highly efficient efflux system that contributes to the intrinsic resistance of *P. aeruginosa* against β-lactams, fluoroquinolones, tetracyclines, chloramphenicol, and other agents. Overexpression of MexAB-OprM, often due to mutations in regulatory genes, further enhances resistance and complicates therapeutic management of infections caused by this pathogen (Avakh et al., 2023; Li et al., 2015).

According to Taheri's theory, there are different T-Consciousness Fields with various functions that are a subset of the Cosmic Consciousness Network. These fields do not have a physical or frequency nature and cannot be measured directly using quantitative tools. More details about this theory are provided in the Common Considerations section of this issue. In short, the possibility of practical investigation in these fields allows researchers to study them through a range of experiments (Taheri, 2013).

Previous studies have explored the influence of TCFs across diverse biological and physiological contexts, including their impact on the MCF7 breast cancer cell line (Taheri et al., 2020a), spatial memory and avoidance behavior in an Alzheimer's disease rat model (Taheri et al., 2021a), wheat plants (Torabi et al., 2020), bacterial population (Taheri et al., 2021b), and alterations in brain electrical activity observed during Faradarmani Connection among Faradarmangars (Taheri et al., 2020b)

This study aimed to investigate the effects of Faradarmani CF on antimicrobial susceptibility in the opportunistic pathogen *P. aeruginosa*. Antibiotic susceptibility was assessed using the disk diffusion test, and the expression of resistance-related genes was examined.

Material and Methods

Application of Faradarmani CF

The samples studied were influenced by the Faradarmani Consciousness Field, according to the guidelines set up at the CosmoIntel Research Center (www.COSMOintel.com). In the present study, Faradarmani CF was *announced* for cultured bacteria in plates for the disk diffusion method as the treatment group. The Faradarmani CF was only applied after the culture of bacteria and before inserting the disks on the test plates.

Preparation of bacteria and disk diffusion test

P. aeruginosa was prepared from the laboratory archive (strains had previously been isolated and biochemically identified) and cultured on blood agar (BA) and nutrient agar (NA).

Two antibiotics, including penicillin and ampicillin, were selected against the resistant strain of *P. aeruginosa* (with up to 70-80% resistance rate). The disk diffusion method was performed according to the CLSI (Clinical and Laboratory Standards Institute) standards. The effects of penicillin (10 units/disk) and ampicillin (10 µg/disk) disks on bacteria were assessed by evaluating three replications of commercial antibiotic disks (Padtan Teb Company). The disk without antibiotics was used as the negative

control. *P. aeruginosa* was cultured uniformly on the surface of BA media using a sterile swab. The Faradarmani CF was applied only after the bacterial culture and before inserting the test plates. Then, the disks were placed at least 2 cm apart with slight pressure. The cultured Petri dishes were incubated at 37 °C, and the diameter of the bacterial growth inhibition zone was measured after 24 hours. The bacteria were cultured in NA medium to confirm the results obtained in BA medium.

Evaluation of gene expression levels

Reverse Transcription Real-Time Polymerase Chain Reaction (RT-qPCR) was performed from bacteria cultured in the BA medium. RNA extraction for the Faradarmani CF treatment and control groups of bacteria was performed using the RNX-plus reagent kit according to the manufacturer's protocol, and to ensure the accuracy of the extraction, quantitative evaluation was performed using a Nanodrop (Thermo Scientific, USA) and 1% agarose gel electrophoresis. The cDNA synthesis was performed according to the Takara (Korea) kit protocol using random hexamers.

Real-time PCR was performed using a Takara Kit (Korean company) to quantitatively evaluate gene expression by analyzing the amplification curve (Ct value). The target genes, *MexA*, *MexB*, and *OprM*, are associated with the MexAB-OprM efflux pump in *P. aeruginosa*. The expression levels were normalized to *rpoD* as the housekeeping gene. The expression levels of mRNAs were calculated using the comparative ΔCt method. The standard strain of *P. aeruginosa* PAO1 (ATCC 27853) was used as the positive control of the reaction. The microtube containing all the reaction material except cDNA was used as the negative control. The primers listed in Table 1 were used.

Table 1. Sequences of primers used in this study

Gene name	Primer Sequences (5'-3')
MexA	F: CGACCAGGCCGTGAGCAAGCAGC R: GGAGACCTTCGCCGCGTTGTCGC
MexB	F: TGTCGAAGTTTTTCATTGAG R: AAGGTCACGGTGATGGT
OprM	F: GATCCCCGACTACCAGCGCCCCG R: ATGCGGTACTGCGCCCGGAAGGC
rpoD	F: GGGCTGTCTCGAATACGTTGA R: ACCTGCCGGAGGATATTTCC

Real-time PCR was performed via the SYBR Green-based PCR Master Mix and analyzed on a Corbett 6000 Rotor-Gene thermocycler (Corbett Research) under the following procedure: one denaturation cycle of 95ºC for 5 min, followed by 40 amplification cycles of 95º C for 30 sec, annealing temperature for each gene for 30 sec, 72ºC for 30 sec and a final extension of 72 ℃ for 5 min. The melting curve analysis was performed to assess the lacking primer dimers and amplification specificity. Relative changes were calculated using the ΔΔCt method.

Statistical analysis

In the disk diffusion test results, zone sizes were measured, and the mean ± standard deviation (SD) was calculated. The Kruskal-Wallis test for nonparametric data and SPSS 18 software were used to analyze the results. The $p< 0.05$ was considered statistically significant.

Results

The figures from the disk diffusion test of antibiotic-resistant *P. aeruginosa* against ampicillin and penicillin disks in each group of the present study are shown in Figure 1 and Table 2.

Faradarmani CF significantly decreased the resistance of *P. aeruginosa* to both penicillin and ampicillin ($p < 0.05$) (Table 2 and Figure 1B), and no inhibition zone was observed around the penicillin and ampicillin disks in the control plate (Figure 1A). Disk diffusion test of Faradarmani-treated blood agar on nutrient agar, performed for penicillin, showed the persistence of this effect (Figure 1C)



Figure 1. Disk diffusion test results for a P. aeruginosa-resistant strain with penicillin and ampicillin disks, and a disk without antibiotic as the negative control. A) Growth of *P. aeruginosa* resistant strain around the antibiotic disks (penicillin and ampicillin) in BA medium and absence of Faradarmani CF, B) Growth inhibition zone of *P. aeruginosa* resistant strain around the antibiotic disks (penicillin and ampicillin) in the presence of Faradarmani CF in BA medium. C) Repetition of the BA medium of the Faradarmani CF treatment group in the NA medium.

Table 2. The inhibition zone (mm) of the disk diffusion test on BA medium of *P. aeruginosa*

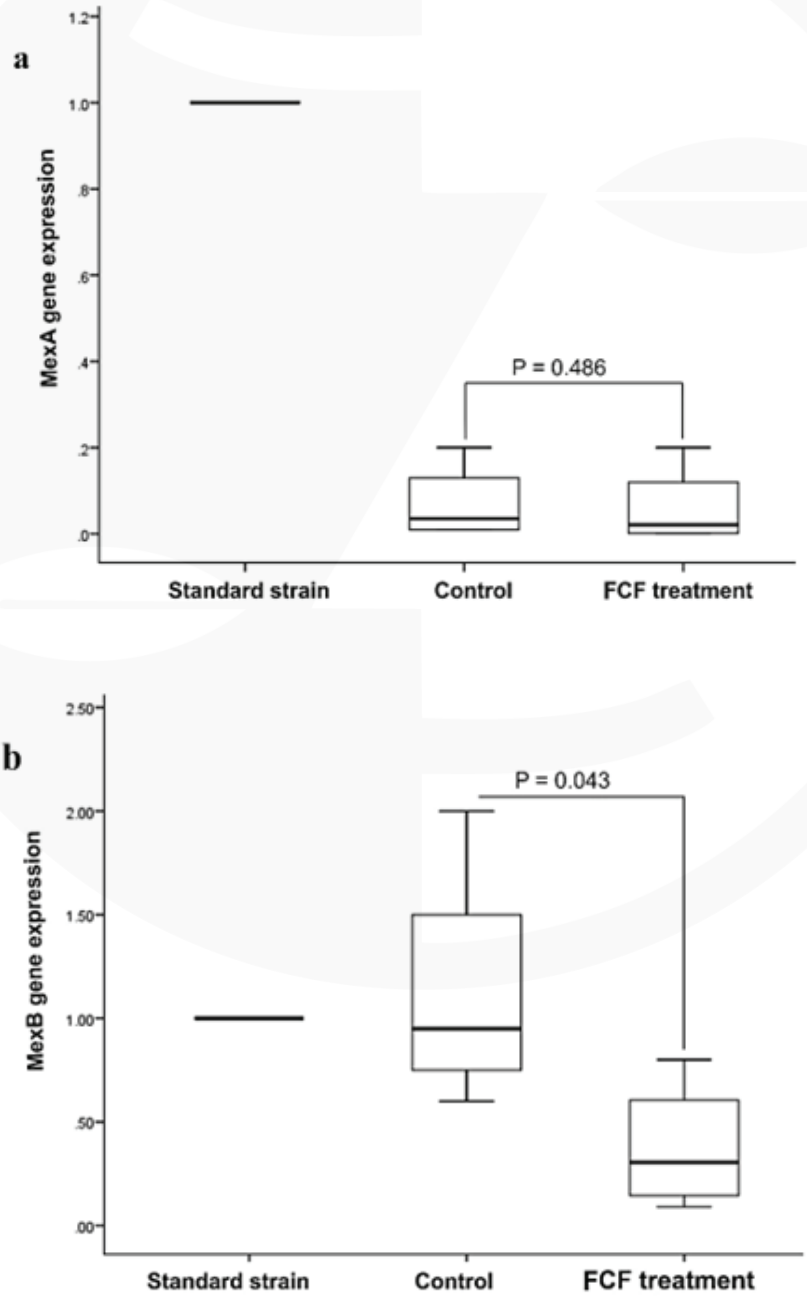
	Control		Faradarmani CF treatment	
Antibiotics	**Ampicillin**	**Penicillin**	**Ampicillin**	**penicillin**
P. aeruginosa	0	0	18±1.6*	20.75±1.5*

An asterisk (*) displays a significant difference compared with the control ($p < 0.05$)

Expression levels of *MexA*, *MexB*, and *OprM* were compared across three groups: standard strain, control, and Faradarmani CF-treated samples (Figure 2). The RNA expression level of *MexA* in the presence of the Faradarmani CF decreased, but this difference was not statistically significant (p=0.486). This result suggests that Faradarmani CF treatment did not alter *MexA* transcription under the tested conditions.

In contrast, *MexB* expression was significantly lower in the treatment group than in the control group (p=0.043). The median expression level in Faradarmani CF-treated samples was approximately threefold lower than in controls, indicating that Faradarmani CF treatment may suppress MexB-mediated efflux activity.

Similarly, *OprM* expression was significantly downregulated in treated samples compared with controls (p=0.042), with a reduction of approximately 2-fold. This downregulation may reflect altered membrane-associated efflux function in response to Faradarmani CF exposure.



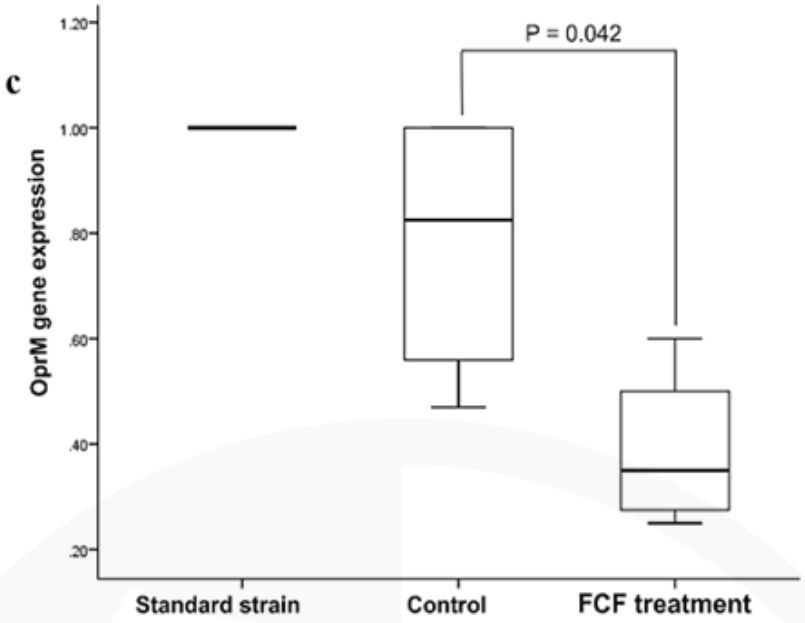


Figure 2. RNA expression level of *MexA* (a), *MexB* (b), and *OprM* (c) genes in the control and Faradarmani treatment and the standard strain of *P. aeruginosa* PAO1 as the positive control. An asterisk displays a significant difference ($p < 0.05$) between the Faradarmani CF (FCF) treatment and control groups.

Discussion

The incidence of drug-resistant infections is increasing in hospitals and other clinical care settings. Infections caused by these drug-resistant microorganisms are difficult to treat, involve challenges in diagnosis and treatment, and cause increased morbidity and mortality (Boucher et al., 2009). Finding a way to treat patients with drug-resistant infections is crucial.

In this study, the effect of Faradarmani CF on the susceptibility of an antibiotic-resistant strain of *P. aeruginosa* was evaluated. It was found that Faradarmani CF increased the susceptibility of bacteria to penicillin and ampicillin in both phenotypic and genotypic tests.

Faradarmani CF treatment selectively modulated the expression of efflux pump genes in *P. aeruginosa*. While *MexA* remained unaffected, *MexB* and *OprM* were significantly downregulated in treated samples (~3-fold and ~2-fold reductions, respectively) compared to controls. These findings suggest that Faradarmani CF treatment interferes with the MexAB-OprM efflux system by suppressing its transporter (MexB) and outer membrane channel (OprM), potentially impairing efflux activity and enhancing bacterial susceptibility to antimicrobials.

TCFs are not directly measurable, but their effects can be investigated indirectly through various experiments. The findings of this study highlight a potential novel approach to reducing antibiotic resistance in opportunistic pathogens, though further research is needed to clarify the underlying mechanisms and evaluate clinical applicability of TCFs.

Acknowledgements

The authors thank the Keyvan Virology Specialty Laboratory (KVSL) in Tehran, Iran, for its laboratory, services, and facilities.

Conflicts of Interest

The authors declare no conflict of interest.

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Ms. Laleh Amani was a prominent, compassionate, and enthusiastic researcher at Cosmointel who passed away in 2021.