Investigating the Effects of Taheri Consciousness Field 1 on the Enzyme-Like Behavior of Gold Nanozyme

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ABSTRACT

The study of chemical structures, with the bio-molecular activity, that mimic the behavior of biological molecules has always been of interest to researchers in the field of early life as well as technology and industry. Among these compounds, a type of nanomaterial with enzyme-like activity, called Nanozyme, has comparable performance with endogenous cellular compounds and has great potential in replacing natural enzymes. Taheri Consciousness Fields, as novel Fields, was founded and introduced by Mohammad Ali Taheri, according to previous several studies. These Fields are neither matter nor energy, having a different nature from known physical fields. The TCFs are capable of influencing the matter and energy of the studied system in order to make it more functional and efficient. These Fields are neither matter nor energy, therefore cannot be measured directly. But it is possible to study their effects on objects through controlled experiments. In this study, we investigate the effects of a type of Taheri Consciousness Field 1 (TCF1) on the physicochemical structure and function of the gold Nanochemical models. Using electron microscopy as well as dynamic light scattering and kinetic assays, we observed significant changes in the nanoparticle particle size distribution (about 20%) and its kinetic constants (about 4%) under the influence of the TCF1. The results of this study confirmed a reproducible effect of TCF1 on the gold Nanozyme behaviors. We suggest that the effect of TCFs on various biomimetic molecules should be investigated to further understand the mechanism of TCFs.

Keywords: Au-Nanozyme, Biomimetic, Taheri Consciousness Fields, enzyme-like activity

INTRODUCTION

Natural enzymes are ubiquitous biocatalysts with high substrate specificity (Cox and Nelson, 2008) that have attracted enormous attention because of their application and utilization in pharmaceutical processes (Chapman et al., 2018), agrochemical production (Barber, 2009), bio-sensing (Leca-Bouvier et al., 2010) and industry (Araújo et al., 2008, Yushkova et al., 2019). Natural enzymes accelerate the rate of chemical reactions up to 1019 times for a specific substrate (Lin et al., 2014). However, these enzymes have several intrinsic drawbacks, which limit their utilization in practical applications. For instance, natural enzymes are proteins or ribonucleic acids, which inevitably require strict physiological conditions for performing their catalytic functions. Other limitations include ease of denaturation, the high cost of synthesis, isolation, and purification. (Singh, 2019; Wang et al., 2016). To tackle these drawbacks, tremendous efforts have been made to develop biomimetic catalysts. Over the past two decades, along with advances in nanotechnology, nanozymes have been designed with better catalytic activities in various conditions, such as changing temperature, pH, substrate availability, and specificity. Such a relatively easy synthesis has attracted considerable attention (Yadav and Singh, 2021). In 2007, it was reported that magnetite nanoparticles (Fe3O4) possess an intrinsic enzyme mimetic activity similar to natural peroxidases (Gao et al., 2007) for the first time. Since then, more than 300 types of nanomaterials have been discovered to mimic the intrinsic enzyme-like activities of peroxidase, oxidase, haloperoxidase, catalase, superoxide dismutase, and glutathione reductase, etc. (Wang et al., 2020). Enzymatic activities partly depend on the function of scavenging free radicals. Nanozyme functions have been divided into two categories, antioxidants, and pro-oxidants, depending on the generation of free radicals (Singh, 2019).

magnetic nanoparticles had peroxidase activity within a large pH range with improved temperature tolerance in comparison with the natural horserad-ish peroxidase (HRP) enzyme. Due to the uniq ue physicochemical properties of nanomaterials, nanozymes have demonstrated a wide range of applications from in vitro detection to the
replacement of specific enzymes in living systems. Now, with the advent of the new branch of "Nanozymol-ogy", nanozymes have become a new field of study and application at the border of nanotechnology and biological knowledge. The nature of consciousness and its place in sci-ence has received much attention in the current century. Many philosophical and scientific theories have been proposed in this area. In the1980s, Mo-hamma d Ali Taheri introduced novel fields with a non-material/non-energetic nature named Taheri Consciousness Fields (TCFs). In this perspective, T-Consciousness is one of the three existing ele-ments of the universe apart from matter and ener-gy. According to this theory, there are various TCFs with different functions, which are the subcatego-ries of a networked universal internet called the Cosmic Consciousness Network (CCN). The major difference between the theory of TCFs and other theoretical concepts about consciousness is relat-ed to the practical application of the TCFs. These fields can be applied to all living and non-living creatures, including plants, animals, microorgan-isms, materials, etc.

Mohammad Ali Taheri, the founder of Erfan Key-hani Halqeh, a school of thought, introduced a new science in 2020 as a branch of this school. He coined the term Sciencefact for this new sci-ence because it utilizes scientific investigations to prove the existence of T-Consciousness as an irre-futable phenomenon and a fact. Although science focuses solely on the study of matter and energy and Sciencefact, by contrast, explores the effects of the [non-material/non-energetic] TCFs, Sciencefact has provided a common ground between the two by conducting reproducible laboratory experiments in various scientific fields, and it has used the scientific approach in proving TCFs.

The influence of the TCFs begins with the Connection between CCN as the Whole Taheri Consciousness of the universe and the subjects of study as a part. This Connection called "Ettesal" is established by a Faradarmangar's mind (a certified and trained individual who has been entrusted with the TCFs). The human mind has an intermediary role (Announcer) which plays a part by fleeting attention to the subject of study and then the main achievement obtained as a result of the effects of the TCFs. These fields cannot be directly measured by science, but it is possible to investigate their effects on various subjects through reproducible laboratory experiments (Taheri, 2013).

The research methodology in the study of T-Consciousness has been founded on the process of Assumption, Argument, and Proof, in which the basic Assumption is: The Cosmos was formed by a third element called T-Consciousness that is different from matter and energy.

The Argument: The existence of TCFs can be demonstrated by their effects on matter and energy (e.g., humans, animals, plants, microorganisms, cells, materials, etc.)

The Proof is the scientific verification of the effects of TCFs on matter and energy (according to the Argument) through various reproducible scientific experiments.

Accordingly, to investigate and verify the existence, effects, and mechanisms of TCFs, the following five research phases (Phases 0 through 4), and the aims of each phase are outlined below.

Phase-0 studies aim to prove the existence of TCFs by observing their effects. The nature of T-Consciousness and what it is will not be addressed in this phase. Phase-1 explores the varied effects of different TCFs. Phase-2 examines the reason behind the varied effects of these fields. Phase-3 investigates the mechanism of TCFs effects on matter and energy. Finally, Phase-4 draws significant conclusions, particularly with regard to the *mind and memory* of and their relation to the T-Consciousness, etc.

Previously, the effects of TCFs have been investigated in different areas including the effects of TCFs on the brain during connection to the CCN (Taheri et al., 2020b; Taheri et al., 2021e; Taheri et al., 2021g), magnetic properties of materials (Taheri et al., 2021h), the effective half-life of technetium 99 (Taheri et al., 2021i), wheat plant (Torabi et al., 2020), MCF7 cancer cell line (Taheri et al., 2020a), Alzheimer disease (Taheri et al., 2021b; Taheri et al., 2021c), bacterial (Taheri et al., 2021d) and viral growth (Taheri et al., 2021a). Another study focused on investigating the structure and function of horseradish peroxidase (HRP) under the effect of TCF which proved the change of the Km and Vmax of this enzyme (Taheri et al., 2021j).

The current study intends to examine the enzyme-like behaviors of gold nanoparticles and analyze their structural and functional state under the influence of TCF1 using spectrophotometry, electron microscopy, and dynamic light scattering (DLS) techniques.

Materials and Methods

Materials: $HAuCl_4 \cdot 3H_2O$, 30% H_2O_2, and 3,3',5,5'-Tetramethylbenzidine (TMB) were purchased from Sigma Co. Ltd, UK. reagents and chemicals were of at least analytical reagent grade. Double-distilled water was used throughout the experiments.

TCF application: TCFs were applied to the samples according to the protocols regulated by the COSMOintel research center (www.COSMOintel.com). A request for Connection to the CCN to utilize TCFs can be placed through the COSMOintel website in the "Assign Announcement" section. This access is available for everyone at no cost. In order to study and experience this Connection, the researchers can register on the website at any time and in order to report the experiment to the COSMOintel research center. Certain details of the experiment must be provided to the center; for example, the characteristics or number and name of samples and controls must be specified.

This entire experiment was car-ried out as a double-blind method where lab techni-cians were completely unaware of TCFs theor y, and the Faradarmangar at the COSMOintel researc h center who established the Connection was unawa re of the details of the study. Double-blind is a gold st andard that is common in science experiments in th e field of medicine and psychology, involving theoreti -cal and practical testing.

Instrumentation: The UV/Vis spectra of gold nanoparticles were recorded on a Varian Cary Bio 100 spectrophotometer. The image of AuNPs was obtained by transmission electron microscope (TE M)(JEOL, Tokyo, Japan) operating at 80 keV. The parti -cles were characterized by dynamic light scattering
(DLS) using 90 Plus Pals (Brookhaven Instruments Corp., USA), and PALS zeta-particle sizing potential analyzer software.

Synthesis F of F Gold F Nanoparticles: F F Gold nanoparti-cles were synthesized by reduction of $HAuCl_4$ with $NaBH_4$, as the sole reducing agent. To put it briefly, $HAuCl_4$ solution (500 mL, 1%) was diluted in water (39.5 mL) while $NaBH_4$ solution (1 mL, 1%) was injected under vigorous stirring (the injection time was about 5 min). An im mediate color change of the solution from pale yellow to a wine-red was observed, indicating the formation of gold nanoparticles. The gold nanoparticles can remain stable against the aggregation in an aqueous solution in a refrigerator at 4°C for at least two months

Assaying the Peroxidase mimetic activity of Au nanoparticles: The assays were carried out in a 1.5-mL tube with AuNPs (5 μg), reaction buffer (0.2 M NaAc, pH 3.5), different concentrations of TMB (0.094, 0.122, 0.188, 0.241, 0.31 and 0.38 mM), and in the presence of the 1M H2O2 solution. The col o-rimetric changes were determined by recording the absorbance at 652 nm.

Calculating the Kinetics parameters: We calculated the kinetic constants Vmax and Km by fitting the re-action velocity values and the substrate concentrations to the Michaelis–Menten equation as follows:

$$V = (V_{max} \times [S]) / (K_m + [S])$$

Where V is the initial reaction velocity, Vmax is the maximal reaction rate observed at saturating sub-strate concentrations, [S] is the concentration of the substrate, and Km is the Michaelis constant. In all steps, two containers were considered blank a nd sample with different labels.

Results

Au-nanozymes structure analysis

Analysis by Electron microscopy:

The diagrams in Figure 1 show the electron microscopic shapes of the structures synthesized in t his study. The electron microscope images indicate that the size distribution of the nanozyme with the TCF 1 treatme nt (Fig 1-a), and without it (Fig 2-b) is different. The differ-ence between untreated and TCF-treated stru ctures is measured by using the Dynamic light scattering technique and is described in the next sec tion.

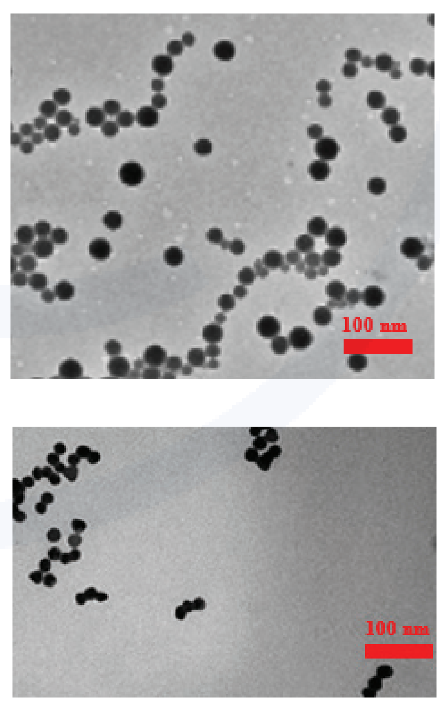

Figure 1. Au-Nanozyme made with (a) and without (b) TCF1 t reatment.

Examining the structures created using the DLS techniq ue: Figure 2 presents the DLS diagrams of the control a nd treated samples.

The Au-nanozymes made under the TCF treatment is approximately 20% smaller in effective diameter and also more homogeneous in size in comparison with the control (Figure 2; Table 1).

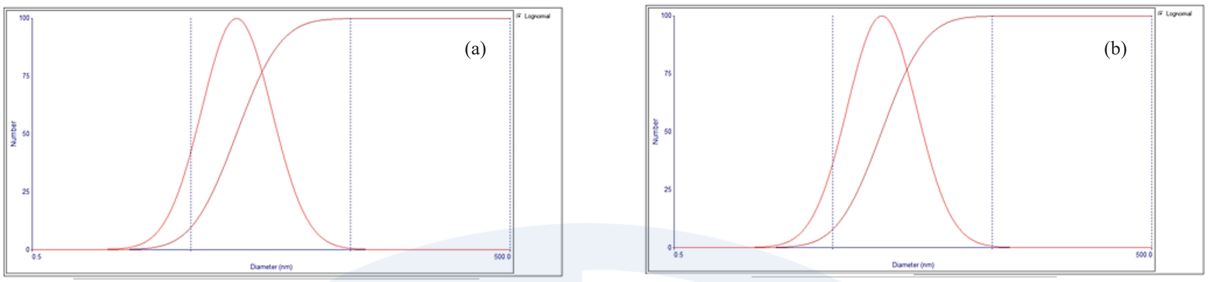

Figure 2. Size distribution of the control (a) and the sample Au-nanozy me (b).

Table 1. Summary of the size distribution for synthesized nanozymes under Taheri Consciousness Field (TCF) treatment versus untreated control

Nanozyme	Effective diameter (nm)	STD	Polydispersity	STD
Control	49.7	6.7	0.309	0.003
Preparation TCF1	40.1	0.2	0.306	0.002

AU-NANOZYMES PERFORMANCE ANALYSIS

The activity of the nanozymes was measured in b oth TCF treated sample and the untreated control . Evalua-tion of the performance of the Au-nanozy mes activity was measured under the TCF1 treatment in comparison with the control and plotted in a Lineweaver-Berg diagram (Figure 4). Moreover, the kinetic constants were calculated (Table 2).

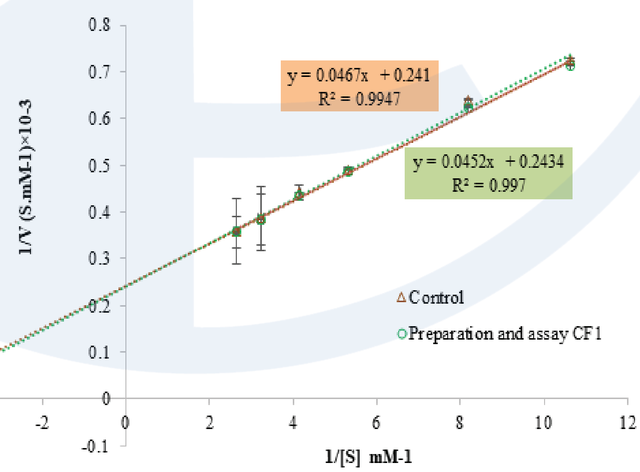

Figure 3. Influence of Taheri Consciousness Field 1 (TCF1) on a LineweaverBu rk plot of the activity of the Au-nanozyme (Preparation and assay TCF1) in H_2O_2 catalysis in comparison with control.

Table 2 . Comparison of the kinetic constants of the samples with the control in the present study

Test No.	Nanozyme	Vmax (mM/s) ×10^{-3}	Km (mM)	Rate (s^{-1})	% Δ Vmax	% Δ Km	% Δ Rate
1	Control (none)	4.14	0.193	490.01	-	-	-
2	Preparation TCF1	4.16	0.193	471.25	0.5	0	-3.8
3	Assay TCF1	4.14	0.192	488.78	0	-0.5	-0.2
4	Preparation and assay of TCF1	4.10	0.185	486.80	-0.9	-4.1	-0.6

As can be observed from the comparison of the dat a in Table 2, the TCF1 treatment during the prepar ation of nanozyme, and without applying TCF1 du ring the kinetic assay (test No. 2), resulted in a 4% decrease in the catalysis rate of the Au-nanozyme.

On the other hand, the TCF1 treatment during the kinetic assay of the same sample (test No. 4) resulted in an increase of 4% in selectivity (decreases in Km) without a significant change in the rate of reaction. Interestingly, in test No. 4, the reduction in the rate of reaction seen with test No. 2, does not happen. Other changes in Table 2 are negligible.

DISCUSSION

Investigating the biologic-like behaviors of chemical systems is an important and major step in under-standing the origin of life. According to Taheri , TCFs have been studied in various fields, including phys-ics, biology, and medical sciences, and the results have been previously reported and some of them are cited in the present study (Taheri et al., 2021 a-g). Considering the theory of TCFs, the probable influ-ence of TCFs on changing the biologic-like behaviors of the chemical molecules is of great importance and helps shed light on understanding the mechanism of life and its formation.

Previously, the behavior of the HRP enzyme in phys-iological conditions, that is, the horseradish plant as well as a similar laboratory-grade HRP was studied (Taheri et al., 2021j). It was found that the use of the TCF treatment in physiological conditions caused an increase in Km and Vmax at 40% and 6% in compar-ison with the control, respectively.

According to the theory of TCFs, the data and information transmitted from the Whole T-Consciousness resulted in changing the behavior of the subject under the treatment and optimizing it. In the previous study of the natural HRP enzyme under the influence of TCF1 (Taheri et al., 2021j), the changed behavior was an increase in velocity and ability to select more diverse substrates by natural HRP enzymes. This behavior is in accordance with the evolutionary experience of biological enzymes in which Km value fluctuations were observed frequently (Pettersson, 1989). In the present study, we used the same enzymatic behavior assays as the catalysis of hydrogen peroxide but used enzyme-like molecules of gold nanoparticles. The TCF1 treatment in this study was performed in two stages of preparation (nanoparticle synthesis) as well as during the measurement of kinetic activity.

TCF1 treatment in the preparation stage leads to about 20% smaller, but more homogenous particle size of Au-nanozymes. These changes cause about a 4% reduction in the H2O2 decomposition reaction rate compared to the untreated controls. Interestingly, the application of TCF1 during Au-nanozyme operation also changes the activity of the nanozyme, making it 4% more specific for its substrate in comparison with the control. In this test (test No. 4, Table 2), the TCF treatment during the kinetic assay also compensates for the deceleration caused by the reduction in the size of the nanozymes during their operation (test No. 2, Table 2). Overall, two optimizations occurred under the TCF1 treatment: (1) the formation of a more homogeneous size of the nanoparticles, and (2) a reduction in the values of Km, suggesting an increase in the substrate selection power. To summarize, this study demonstrates the effect of TCF1 on the biomimetic behavior of gold nanozyme by considering the parameters of particle size and homogeneity, and substrate selectivity. We recommend that other researchers investigate various biomimetic models under the influence of TCFs to further explain the behaviors of these chemical systems and the mechanism of these novel Fields. Moreover, according to Taheri, th ese non-material/non-energetic Fields play an impo rtant role in life formation.

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