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Stem cell therapy; a potential strategy to improve ovarian function during premature ovarian failure

Mahdi Mahdipour
Tabriz University of Medical Sciences, Iran

Statement of the Problem: Women who have ovarian insufficiency during their reproductive age and depletion of ovarian follicles as well as hormonal dis-functions before to age 40 tending toward infertility, cardiovascular disease, endothelial dysfunction, osteoporosis, etc., known as premature ovarian failure (POF). Besides available options for treatment including hormone replacement therapy, effective and long lasting alternative is highly demanded. Stem cells have the ability to involve in various regeneration strategies including infertility. Several stem cell lineages, including bone marrow-derived, adipose and umbilical cord, stem cells have been successfully incorporated to improve ovarian function; however the efficiency of other sources for stem cells remained to be explored.

Methodology & Theoretical Orientation: Different alternative cell/cell-product based therapeutics have been integrated for treatment in a rat model of POF. These models are produced using chemotherapic agents such as cyclophosphamide (CTX) in about four weeks. Following confirmation of animal modeling using histological and hormonal analysis, stem cells from various sources are enriched and injected directly into the ovarian tissue in a surgical operation. Animals are divided into group of experimental and the control to evaluate the effectiveness of the therapy. According to the protocol, after few weeks, from every group, some animals are euthanized and subjected to histopathological and hormonal analysis. As a routine some of animals from every group is kept for mating trials to evaluate the fertility preservation after therapy.

Findings: Studying several sources of stem cells for POF models have revealed that, stem cells are unique type of cells and could participate in regeneration of damaged tissue and trigger folliculogenesis and restore hormonal function. Our findings further shows that the fertility status in stem cell recipient rats is preserved and normal number of offspring were born following mating and gestation similar to the control group.

Biography

Mahdi Mahdipour received his PhD in Biotechnology from Utrecht University, the Netherlands in 2016. Currently he is acting as an assistant professor of reproductive biotechnology at Tabriz University of Medical Sciences, Tabriz, Iran. His research interest is focused on reproductive related therapeutics implementing stem cells and cell free products for regeneration and rejuvenation of reproduction.

mahdi.mahdipour@gmail.com

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Effect of growth regulators and nacl stress on callus formation and alkaloids production on Vinca rosea plant (Catharanthus roseus L.)

Youssif Mahmoud Ahmed
AL Azhar University, Egypt

Vinca alkaloids are a subset of drugs obtained from the periwinkle plant, they are naturally extracted from the pink periwinkle plant (Catharanthus roseus), and they have been used to treat diabetes, high blood pressure and have been used as disinfectant, the vinca alkaloids are also important for being Cancer resistant, there are four major vinca alkaloids in clinical use: Vinblastine (VBL), vinorelbine (VRL), vincristine (VCR) and vindesine (VDS), vinca alkaloids are the second-most-used class of cancer drugs and will stay among the original cancer therapies, Catharanthus roseus is still source used for the powerful antitumor drugs(vinblastine and Vincristine), The vinca plant also contains reserpine alkaloids. and serpentine. Both are considered a powerful sedative to control emotional emotions, Vindoline and catharanthine Which reduce high blood pressure, as well as reduce high blood sugar level. Callus culture had been done on MS-medium, containing Different, Concentrations from BA – 2,4-D – NAA – IAA, Where the different effects of growth regulators were studied when different parts of the plant have been cultured from leaves and stems, this is to induce callus formation and encourage growth, and the concentrations that were, prepared: BA (0,1 – 0,3 – 1 – 2 mg/l), NAA (0,1 – 1 mg/l) _ IAA (0,1 mg/l), 2,4-D (0,75 – 1 mg/l) And after culture the explants we transferred it to the growth room with a temperature ranging from 27 to 29 ° C, relative humidity around 80%, And in complete darkness, then we applied the resulting callus tissue under the influence of different concentrations of NaCl as (50 – 75 – 100 – 150 mM/L), The results from HPLC analysis in the dry weight of callus were as follows, ajmalicine (0.18 mg/g DW), catharanthine (0.07 mg/g DW), serpentine (0.37mg/g DW, vindoline (0.11 mg/g DW).

Biography

Youssif Mahmoud Ahmed, B.Sc. in Biotechnology, Faculty of Agriculture, AL Azhar University in Cairo, Egypt (2021). As a speaker, I participated in International E-Conference in Plant Sciences, Oral Presentation Structured by united research forum LONDON, UK. I have good experience in Molecular Biology, Genetic Engineering and python programming language. I will continue my masters studies because of my passion for learning, so To expand my knowledge, enhance my skills and develop my career in the field of scientific research, we must continue to learn.

youssifmahmoud19999@gmail.com

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Identification of a putative master regulator of disease resistance receptor proteins for enhancing broad-spectrum pathogen and pest resistance in soybean

Madan K Bhattacharyya
Iowa State University, USA

Plants are evolved with disease resistance mechanisms to fight innumerable number of pathogens. There are many different types of genetic mechanisms that allow plants to fight successfully against most pathogenic organisms. We observed that expression of four classes of soybean genes are rapidly suppressed following infection of soybean with its fungal pathogen Fusarium virguliforme that causes sudden death syndrome (SDS). We hypothesized that the pathogen suppresses the expression of these genes to overcome the possible immunity mechanisms contributed by these genes. To test this hypothesis, we exchanged the promoters of one member from each of the four classes of genes with two infection inducible strong leaf and root-specific promoters for overexpression in transgenic soybean plants. Three gene members enhanced SDS resistance in transgenic soybean plants. One of the them, GmDR1 enhanced resistance not only against F. virguliforme, but also against soybean cyst nematode, soybean aphids and spider mites. To understand the molecular basis of this broad-spectrum resistance induced by GmDR1, we conducted a transcriptomic study of the soybean leaves treated with chitin, a molecular pattern found in all four pathogen and pests. We identified 10 TIR-NB-LRR, one CC-NB-LRR, two NB-ARC-LRR, five LRR kinase and one WRKY transcription factor genes, transcription of which was significantly induced among the transgenic lines overexpressing GmDR1 as compared to the control plants. A subset of these genes is significantly induced in F. virguliforme infected roots of transgenic soybean plants as compared to that in the nontransgenic control. Our data suggest that GmDR1 is most likely a master switch that regulates the expression of several disease resistance receptor protein genes for enhancing broad-spectrum disease resistance in soybean.

Biography

Madan Bhattacharyya teaches the Plant Genetics course (Agron 527) for graduate students. His main focus of research is soybean sudden death syndrome, though he is also interested in other plant-pathogen interactions.

mbhattac@iastate.edu

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Screening Activated Sludge Microbiome for Azo Dye Containing Wastewater Treatments

Cristiano J Andrade
Federal University of Santa Catarina, Brazil

The effects of Azo dye-containing wastewater into the environment are devastating. Thus, it needs to be properly treated before its disposal – usually into water bodies. Activated sludge is an association among many (micro) organisms in a community, composed of aerobic and anaerobic bacteria and fungi that are dye-degrading (decolourization and mineralization). Nevertheless, there is a lack of information on specific degrading species, and their interaction themselves (Microbiome). This information can significantly enhance the azo dyecontaining wastewater treatments. Therefore, the aim of this study was to evaluate the bacterial community of an activated sludge sample from real textile industry, by isolating and identifying the Reactive Red 141-degrading bacteria strains. A wide range of bacteria species was identified by matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) including aerobic (Lysinibaciullus fusiformis) and facultative anaerobic (Escherichia coli). Preliminary data indicated the Azo-degrading potential of Bacillus thuringiensis and Kosakonia radicincitans. It is worth noting that this is the first report on K. radicincitans decolourization. Brain Heart Infusion (BHI), glucose, and RR-141 were used as carbon sources. However, only at BHI and glucose systems lead to decolourization activity, indicating that RR-141 cannot be used as carbon source. Both strains exhibited decolourization ability, reaching 43% decolourization in BHI by B. thuringiensis, and 21% in mineral medium with glucose by K. radicincitans. A yield above 40% was reached by applying them simultaneously at the same reaction medium, at non-optimal conditions. Synergy interactions between the microbial consortium, directly or indirectly, affected degrading yields and should be further investigated. Regarding phytotoxicity, a incomplete dye mineralization was observed. The degradation result solutions did not promote the germination of the seeds, which can be associated with the formation of toxic aromatic amines. The HPLC-MS analyses proved that the decolourization process was carried out, however, very likely, due to microbial adsorption.

Biography

Andrade has plenty of experience on biotechnological processes, in particular fermentation, bacterial metabolism, bioproducts with high surfactant activity, purification processes (ultrafiltration), algae cultivation and green-based extraction methods, and identification of biomolecules by mass spectrometry. Dr. Andrade works as Professor in the Department of Chemical and Food Engineering (EQA)/ Federal University of Santa Catarina (UFSC), and also in the Graduate Program in Chemical Engineering at UFSC (PósEnq). Dr. Andrade has published 38 scientific articles, 13 book chapters, and 2 patent deposits.

eng.crisja@gmail.com

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Biosynthesized α-MnO2-based polyaniline binary composite as efficient bioanode catalyst for high-performance microbial fuel cell

Yilkal Dessie
Adama Science and Technology University, Ethiopia

Microbial fuel cell (MFC) has novel technological advance in the simultaneous power generation and wastewater treatment applications. In this study, the low-cost biosynthesized α-MnO2 nanoparticles (NPs) encapsulated with conducting polyaniline (PANI) matrix to form α-MnO2/PANI hybrid Nano composite was fabricated by in situ polymerization method. The prepared material was characterized through UV-Vis spectroscopy, XRD, FTIR, TGA-DTA, DSC, SEM, cyclic voltammetry, and impedance spectroscopy. MFC performance study was done by using an external resistance in the range of 100 Ω-100 kΩ. The continuous test on bare pencil graphite electrode (PGE), α-MnO2/PGE, PANI/PGE, and α-MnO2/PANI/PGE were evaluated in glucose-fed-Escherichia coli based MFC. It was found that α-MnO2/PANI/PGE produces a maximum power and current densities of 426.26 ± 38.89 mW m-2 and 2485.51 ± 397.31 mA m-2, respectively. This was 6.5 and 5.7-fold higher in power and current densities than unmodified PGE. The maximum chemical oxygen demand (COD) produced by hybrid composite modified anode during closed circuit voltage or with external resistance (CCV) and open circuit voltage (OCV) (circuit without connecting external resistance) measurements were found to be 88.19% and 92.27%, respectively. A maximum of 650.61 ± 10.11 mV OCV was obtained by α-MnO2/PANI/PGE while 222.36 ± 8.16 mV of OCV was generated by PGE.

Biography

Yilkal Dessie received his BSc and MSc degrees in chemistry and physical chemistry from Ambo University (Ambo, Ethiopia) and Addis Ababa University (Addis Ababa, Ethiopia) in 2010 and 2012, respectively. After six years of working as a lecturer and researcher in Adama Science and Technology University (Adama, Ethiopia). He has published nearly 13 peer reviewed journal articles. He is currently a doctoral fellow at Adama Science and Technology University (Adama, Ethiopia). His research interests focus on nanocomposite materials for energy conversion and wastewater remediation using bio electrochemical system. His current research activity involves mostly work on energy and environment.

yilikaldessie@gmail.com