Editor
Carlos M. Travieso-Gonzalez

Recent Advances on Biomedical Sciences

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Seoul, South Korea, September 5-7, 2015

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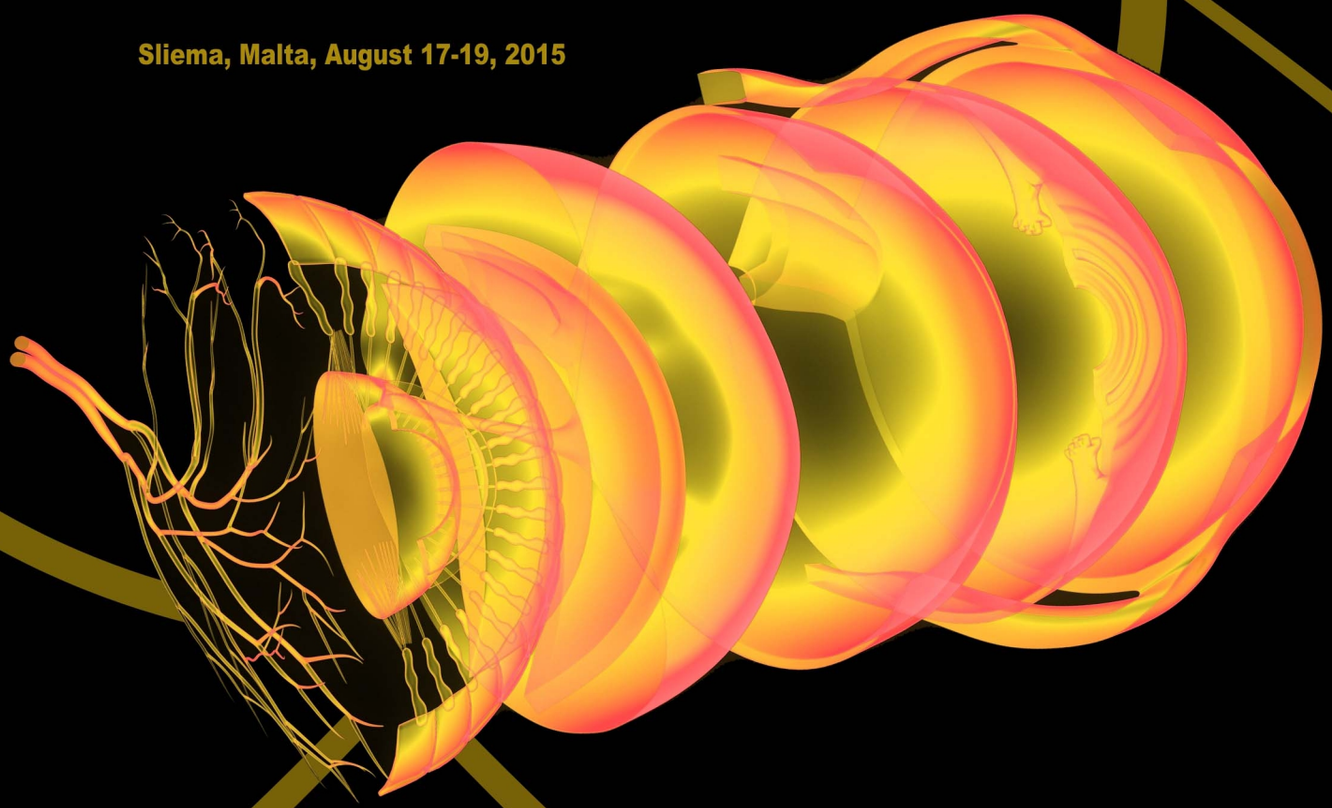

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Plenary Lecture 1

Control Functions and Bipolar Potentials in Excitatory Cells – Characteristics of Neuron and Unicellular Organism

Professor Atsushi Fukasawa
Institute of Statistical Mathematics
Japan
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Abstract: Secretary, muscle, and neural cells in multicellular organism induce excitations for stimulations. Upon reception of external or internal stimulation, potential pulses are induced in excitatory cells when reception potential exceeds threshold. Unicellular organisms are the other type of excitatory cells.
He will present first how unicellular organisms control cilia of paramecium and tentacles of noctiluca. Forward or backward movements by cilia of paramecium, and expansion or contraction of food gathering tentacles of noctiluca are controlled by positive and negative potentials generated in a single cell.
Recently not only positive potential (pulse and plateau) but also negative potential plateau are reported in studies in neural systems. Common basis of activity in neurons will be presented on dual configuration with Na+ and Cl- as the dominant charges (ions) for bipolar action potentials.

Brief Biography of the Speaker: Atsushi Fukasawa received the Master of Arts degree and Ph.D. degree from Waseda University in 1967 and 1983. He was a professor in Graduate School of Natural Science, Chiba University in 1997. He received the Award of the Agency of Science and Technology, Japan in 1982, and Ohm (publisher) Prize in 1994. He received Telecommunication System Technology Prize from the Foundation of Telecommunication Association, Japan in 2004. He is a senior member of the IEEE.
Dr. A. Fukasawa and his colleague, Dr. Y. Takizawa are the recipients of the Best Paper Award of Neurology'12, SummerMed., WSEAS/NAUN, July 2012.

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Plenary Lecture 2

The Usage of Liver Extract Versus Growth Factors in the Differentiation of Mesenchymal Stem Cells into Hepatocyte Like Cells

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Abstract: Liver cell transplantation and cellular-based therapies evolved as viable clinical alternatives to whole organ transplantation required in some liver diseases. Differentiation of stem cells into hepatocyte like cells would provide a renewable source of exogenous hepatocytes for drug toxicity testing and cell-based therapeutics. Many protocols of in vitro differentiation of stem cells into hepatocyte like cells had been employed to check the ability of differentiation as well as the functional efficacy of differentiated cells. But still the exploration of an easy and affordable one is needed to facilitate MSC differentiation into hepatocytes. In this study, we employ three different protocols of differentiation of bone marrow mesenchymal stem cells (MSCs) into hepatocyte-like cells with a view to developing easier and affordable protocol using liver extract verses expensive growth factors cocktails. MSCs were isolated from rat?s bone marrow using the plastic adherence technique. Cells were then sub-cultured till passage 3 for their purification and proliferation. CFU-F assay and immunological characterization was done through the flow cytometric analysis of CD29, CD90 and CD45 surface markers. Flasks then were divided into four groups, first; control group cultured in proliferative media. Second group; cells cultured in hepatocytic differentiation media 1 (HDM) 1 containing FGF-4. Third group; cells cultured in HDM2 containing FGF-4 and HGF and finally fourth group; cultured in HDM3 containing liver extract instead of the previously mentioned growth factors. Cells were tested for their differentiation morphologically and functionally through assessing Urea secretion, glycogen storage and gene expression of albumin by RT-PCR. Flow cytometric analysis showed that after passage 3, the cells do not express hematopoietic marker CD 45 but express the two mesenchymal markers CD29 and CD90. Cells cultured in HDM2 and HDM3showed morphological changes of hepatocyte like cells in day 12 and day 15 respectively, these changes didn?t appear neither in control group nor in cells cultured in HDM1. Urea production and secretion by hepatocytes like cells were detected at various time points throughout differentiation. In the HDM 2 and 3 groups cells produced urea 3 d later, and in a time-dependent manner. On d 24, the amount of urea produced by differentiated bone marrow cells reached the maximum amount and was detected with a concentration of 23.06±11.9 mmol/L on HDM 2, and 20.89±10.44 mmol/L on HDM 3. Cells in the control and HDM 1 groups did not secret any urea. Intracellular glycogen accumulation was analyzed by staining the cells with the PAS reagent. On d 24 accumulation of glycogen was detected in the HDM 2 and 3, while no accumulation of glycogen was found in the other groups. Albumin mRNA was detected by RT-PCR, the results showed that the cells cultivated in HDM 2 and 3 expressed albumin, while in control group and HDM 1 did not. The usage of liver extract in the differentiation of MSCs into hepatocyte like cells proved to be almost as effective as the usual used cocktail of HGF and FGF, yet more affordable and easier approach, thus useful in providing a renewable source of exogenous hepatocytes for drug toxicity testing and cell-based therapeutics.

Brief Biography of the Speaker: Dr Sh. Muawia holds a BSc in Biochemistry from Faculty of Science- Alexandria University-Egypt. She holds a Master degree & a PhD in Biochemistry (1992, 2001 respectively) from the Faculty of Science- Alexandria University. She works as a Professor of Biochemistry and Molecular Biology in the Molecular Biology department in Genetic Engineering and Biotechnology research Institute (GEBRI) - Sadat City University-Sadat City. She is the vice dean of the environmental affaires and community services in the GEBRI.
Her research interests include: Apoptotic signaling pathway and apoptotic markers in different tumors (adult acute myeloid leukemia and in Hepatocellular Carcinoma) and in HCV patients. Single nucleotide polymorphism and gene expression of different genes in various diseases and tumors. Oxidative stress and antioxidant defence beside cytokine expression on the molecular and protein levels. She has 30 publications in highly rated ISI journals and attend 38 conferences.

Authors Index

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