Editor's Note

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Biochemistry & Molecular Biology Journal
ISSN 2471-8084

2016
Vol.2 No.2: 15

Note by Editor-Biochemistry and Molecular Biology Journal

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Received date: August 21, 2016; **Accepted date:** August 23, 2016; **Published date:** August 28, 2016

Citation: Armen Petrosyan. Note by Editor-Biochemistry and Molecular Biology Journal. Biochem Mol Biol J. 2016, 2:2.

Editorial

I am delighted to launch the Volume 2 of Biochemistry and Molecular Biology Journal, a product of the Insight Medical Publishing. Our purpose is to provide a journal that offers a multi-disciplinary analysis of issues concerning the different aspects of the structural, biochemical and cellular basis of biological processes. I am pleased to note that Issues 1 and 2 of Volume 2 collected remarkable articles written by well reputed scientists from across the world, under on platform of cell science and therapy. For your convenience, below are a summary of these manuscripts.

Dr. Bucciantini lab presented the interesting aspects of the ability of Oleuropein aglycone, the main phenolic component of the extra virgin olive oil, to inhibit the toxic effects of TTR-mediated amyloid (Efficacy of Oleuropein Aglycone in the Treatment of Transthyretin-Amyloidosis).

In their review article, Dr. Ichida and colleagues discussed regarding the role for KRAB domain in the structure and function of zinc finger protein 809 (ZFP809), which has a central role in the transcriptional suppression of Moloney murine leukemia virus. (Functional and Structural Features of Zinc Finger Protein 809).

Discussions about the two types of extracellular vesicles, ectosomes and exosomes, are now very popular in cell biology; Dr. Meldolesi presented the short guide to the biogenesis of these two vesicles, their dissolution/navigation and the fusion with specific target cells (Ectosomes and Exosomes-Two Extracellular Vesicles That Differ Only in Some Details).

Dr. Kupriyanova group provided the different aspects of the fundamental question of whether the deregulation of ribosomal RNA (rRNA) synthesis itself could trigger a cell transformation, and whether increased rRNA synthesis plays an essential role in tumorigenesis (Management of rRNA Transcription Activity in a Human Genome).

It is known that the DNA-loops are necessary to recycle the RNA polymerase for the multiple transcription rounds of a gene. Dr. Freire-Picos described regarding evidences (RNA Polymerase II: Reading in Loops to get Different Tails) which indicate that RNA polymerase has to read the different loops in order to get messages with different tails, which will depend on the cellular requirements.

In their Commentary (Emerging New Aspects of Toll like Receptor-2 during Mycobacterium tuberculosis Pathogenesis), Dr. Meena et al. discussed regarding the role of Toll like Receptor 2 in the signaling cascade which initiates antimicrobial action in infected macrophages, which, in turn, may have a potential to control inflammation during chronic tuberculosis.

The mini review prepared by Dr. Studitsky and colleagues (Nucleosomal Barrier to Transcription: Structural Determinants and Changes in Chromatin Structure) summarizes the current understanding of how packaging of DNA into chromatin affects all processes on DNA: nucleosomes present a strong barrier to transcription, raising important questions about the nature and the mechanisms of overcoming the barrier.

Editorial article from Dr. Rangrez group (Multi-facets of Serum Response Factor in the Cardiac Pathophysiology) summarizes the current knowledge of multiple signaling pathways and interacting networks that have been implicated with the heart's molecular response to physiological and/or pathological biomechanical stress.

The original manuscript from Dr. Zubow and colleagues (Phenomenal Properties of the Domain Ensembles in Proteins) is a rigorous study of the long-range order in collagens and gelatins at the level of domains up to 210 million Daltons. Specifically, the authors found that domain ensembles were not constant, but dynamic systems that reflected the state of supramolecular structures of protein chains. Importantly, the domain ensembles in collagens and gelatins actively influenced the cluster ensembles in the water and vice versa. Given that formation of domain structure of native collagens from industrial gelatins is a potential problem, these results may serve as a platform for a new biochemistry medicine in the 21st century.

Recombinant antibodies are the useful tools for many applications, including penetration of tumors, genetic and chemical modification. Establishment of a good expression system for recombinant antibodies which may improve their yield, purity, and quality is a very important task. In the story from Dr. Hanyu lab (Fusion of Zif268 to the C-Terminus of Scfvs Promotes Expression of the Active Form in the Cytoplasm of Escherichia coli), the single-chain variable fragments (scFv) was expressed as a fusion protein with Zif268 at its C-terminus. These scFvs fusion proteins were expressed at high levels in the cytoplasm of E. coli in a soluble and active form. The reactivity of Zif268-fused scFvs against the antigen was

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identical to that of unfused scFvs. Thus, C-terminal fusion of Zif268 appears to function as a tag that promotes the solubility and expression of scFvs, which will, in turn, improve their purity, yield, and stability, and increase the efficiency of screening technologies for scFvs.

Doxorubicin is widely clinically used agent to treat various neoplastic disorders, and it acts by inducing oxidative stress in the neoplastic cells. However, the brunt of free radicals is also felt by the normal tissues, leading to the development of second malignancies. Dr. Jagetia group (The Citrus Flavanone Naringin Enhances Antioxidant Status in the Albino Rat Liver Treated with Doxorubicin) evaluates the effect of naringin, a citrus bioflavanone, on the doxorubicin-induced oxidative stress in rat liver. Interestingly, the naringin pre-treatment has been able to elevate the glutathione-S-transferase (GST) concentration, and activities of GST, catalase and superoxide dismutase. This was accompanied by a significant decline in the doxorubicin-induced lipid peroxidation in the rat liver. Importantly, inhibition of NF-κB and COX-II by naringin may suppress the inflammation and reduce the DOX-induced hepatotoxicity. Thus, this study demonstrates that naringin is able to arrest the doxorubicin-induced oxidative stress by raising the antioxidant status and reducing lipid peroxidation.

Hemozoin (Hz) is released from ruptured erythrocytes during malaria infection caused by Plasmodium sp. Dr. Christman and colleagues studied the molecular interactions between Hz, bacterial components and macrophages (Hemozoin Regulates iNOS Expression by Modulating the Transcription Factor NF-kB in Macrophages). Specifically, they found that macrophages, which were treated with various concentrations of Hz, did not show the increase of expression of inducible nitric oxide synthase (iNOS); however, when macrophages were pretreated with Hz and then challenged with interferon gamma (IFNγ) or lipopolysaccharide (LPS), the expression of iNOS was enhanced. Furthermore, there was an increased activation of NF-κB in Hz phagocytosed macrophages that were challenged with IFNγ. Thus, the authors concluded that the interaction between Hz and macrophages has an impact on iNOS expression.

Another interesting story is provided by from Dr. Kubyshkin and colleagues (Antimicrobial Effects of Silver Nanoparticles Stabilized in Solution by Sodium Alginate). Investigation of the biological properties of the metal nanoparticles is associated with significant recent progress in nanomedicine and nanopharmacology, and it is one of the priorities of modern biomedical nanotechnology. The international group was studying the effect of a nanosilver solution in a matrix of sodium alginate on the growth and development of pathogenic bacteria. It appears that the biocidal effect of nanosilver is related either to the presence of ions that are formed during dissolution, or to the availability of nanoparticles that interrupt the membrane permeability of bacterial cells. The authors concluded that the silver nanoparticles stabilized in a solution of sodium alginate possess significant in vitro antimicrobial activity, which is manifested by inhibition of the bioluminescence of P. leiognathi Sh, and inhibition of the growth and development of the pathogenic bacteria S. aureus, E. faecalis, E. coli, P. vulgaris, E. cloacae, the antibiotic-resistant strain of P. aeruginosa, and the fungus C. albicans.

Dr. Kopytova et al. presented their latest discovery (Orc3, A Subunit of Drosophila Pre-Replication Complex Directly Binds mRNA and Interacts with ENY2 Subunit of the TREX-2 mRNA Export Complex). The Orc proteins in higher eukaryotes have additional functions distinct from their role in replication initiation. Previously, this group found that in Drosophila, Orc interacts with the TREX-2/THSC/AMEX complex involved in the mRNA transport from the nucleus to the cytoplasm. Here, they studied interactions of the Orc3 protein, a subunit of Orc complex, with the Xmas-2 and ENY2 subunits of the TREX-2 complex and have demonstrated that Orc3 directly interacts with ENY2. These interactions were carried out by both the N-terminal domain and the C-terminal domain of Orc3. Interestingly, the N-terminal protein domain of Orc3 showed different affinity for RNA, than the C-terminal region. At the same time, the protein corresponding to the Orc3 C-terminal domain bound with the highest affinity to the different parts of the coding region of the ras2 mRNA. The authors hypothesized that Orc3 protein contains another, yet unidentified nucleic acid-binding domain which is located in its C-terminal part.

This article is available from: 10.21767/2471-8084.1000E104