Conference Report

Nanotechnology Congress & Expo 2015, Frankfurt, Germany August 11-13, 2015

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The OMICS International Conference Series group organized Nanotechnology-2015 in Fleming's Conference Hotel, Frankfurt, Germany from 11th August to 13th August where nanomedicine and drug delivery were highlighted along with materials nanotechnology involving physics and engineering sciences. The focal theme of the Frankfurt congress was nanotechnology and life sciences.

The application of nanotechnology to the field of medicine is now at the cutting edge of scientific research. This fusion, termed Nanomedicine, in essence represents an approach whose goal is to indentify new modalities for therapeutic application of difficult-to-treat pathologies, in particular, neurological diseases. Within this context we highlight below some key presentation taken from the recent Nanotechnology-2015 meeting.

The 2 ½-day congress was divided into 6 tracks focusing on various aspects of nanotechnological advances over the years.

The conference's first day (August 11, 2015) opened with brief introductions by Hari S. Sharma (Uppsala, Sweden) and Hussein O. Ammar (Cairo, Egypt) on the need of nanotechnology in the life sciences. This was followed by 3 Keynote addresses: Hari Sharma on "Nanodelivery of a multimodal drug cerebrolysin reduces brain pathology following amyloid beta peptide infusion-induced Alzheimer's disease"; Mahi R. Singh (London, Ontario, Canada) speaking on "Study of quantum optics in metamaterial nanostructures"; and lastly, Ashok Vaseashta (Orangeburg, SC, USA) who delivered a talk on "Aquatic ecotoxicity of nanoparticles".

Track 1, which dealt with advanced nanomaterials was chaired by Sabyasachi Sarkar (Shibpur, WB, India) and divided among five speakers who discussed: synthesis of subnano-size metal particles (Kimihisa Yamamoto, Tokyo, Japan); thermo-responsible (responsive?) polymers (Theoni Georiou, London, UK); graphene and related nanostructures (Balint Nafradi, Lausanne, Switzerland); monolayer graphene nanoribbon field for transistors (Mehdi Saeidmanesh, Johor, Malaysia).

Nanomaterial fabrication and characterization tools were the subject of Track 2, chaired by Michael Hietschold (Chemnitz, Germany) with six presentations: Michael Hietschold discussed nanopattern control for molecule assembly, followed by electron nanoscopy and neutron diffraction (Werner Lottermoser, Salzburg, Austria);, metal nanostructures for surface enhanced spectroscopy (Yuko Yamamoto, Kagawa, Japan); bio-composite-based magnetic nanostructures (Beata Kalska-Szoztko, Bialystok, Poland); nanodosimeter for radiotherapy (Abdulhamid Chaikh, Grenoble, France); and, fabrication of nano-organic semiconductor monolayers (Alexander Eberle, Munich, Germany).

The day concluded with a networking workshop by Ashok Vaseashta on nanotechnology for contamination detection, remediation and water purification.

The 2nd day of the conference (August 12, 2015) started with was Track 3 on nanoscale electronics and Track 4 on nanotechnology for energy requirements. In total eight speakers from Japan, Taiwan, Germany, Portugal, France and Spain were involved.

These were followed by Track 5 devoted to nanotechnology in the Life Sciences and Medicine, chaired by Hari S. Sharma and Hussein O. Ammar. Ten speakers addressed this session. To begin with, new trends in nanotechnology-based targeted drug delivery systems was discussed by Hussain Ammar, followed by Nekane Guarrotxena (Madrid, Spain) who emphasized multiplex targeted disease biomarkers using a surface-enhanced Raman spectroscopy probe. Magnetophoretic circuits for digital cells on a chip were demonstrated by Cheol Gi Kim (Daegu, Korea). Christoph Rehbock (Duisburg, Germany) then discussed ligand-free alloy nanoparticles for applications in nano-toxicological assays. New routes in treating brain disorders using nanotechnology was presented by Sylvia Wagner (Sulzbach, Germany). Functionalized polymeric electrospun nanoscaffolds for bone regeneration and tissue healing were the topic of a talk by Anand Gadre (Merced, CA, USA). The concept of surface-enhanced Raman spectroscopy-based femto-sensitive nanosensors for protein detection was nicely demonstrated by Nekane Guarrotxena. Nor Hazwani Ahmed (Penang, Malaysia) next discussed cytotoxicity of silver nanoparticles in cancer cell lines. Nanocarbon onions cross the blood-brain barrier with potential to entrap and release Alzheimer's disease drugs in the brain, as described by Sabyasachi Sarkar. Ahmet Alper Ozturk (Anadolu, Turkey) concluded the session with a discussion on the preparation and characterization of dexketoprofen-loaded nanoparticles in neuroprotection.

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The above session was followed by presentation of several key posters. The first dealt with TiO_2 nanodelivery of a serotonin 5-HT3 receptor antagonist to reduce brain pathology associated with sleep deprivation-induced depressive illness (Aruna Sharma, Uppsala, Sweden). Other posters of interest included functionalized dextran nanoparticles for drug delivery to the brain by Daniel Ibegbu (Portsmouth, UK); nanoparticle transport in a tumor-like environment (Devika Chitrani, Toronto, Canada); role of apolipoprotein E in uptake of atovaquone into the brain in murine acute and reactivated toxoplasmosis (Hend Shubar, Berlin, Germany); PGJ nanoparticle association to acellular human amniotic membrane scaffold: a new system for local anti-inflammatory therapy (Julio Francisco, Sao Paulo, Brazil).

The 3rd and final conference day (August 13, 2015) began with a workshop, "New understanding on the physical and mechanical properties of materials, using computational and experimental nanotechnology" by Joseph Antony (Leeds, UK). This was followed by the Track 5 and Track 6 presentations. Track 5 covered Tetraherz Nanoscience and comprised five speakers from Japan and Germany. Track 6 was based on nanotechnology safety and addressed by five speakers from the UK, Slovenia, Egypt and Canada.

The deliberations on nanomedicine and nanotechnology presented in this congress highlight the future use of nanomedicine to treat diseases affecting the human population, ranging from depression to neurodegenerative diseases. About 300 delegates comprising researchers, nanotech industry, policy makers, healthcare providers and students alike expressed a high degree of enthusiasm with the latest developments on nanomedicine which were presented in this congress.

The next meeting, Nanotechnology-2016 is scheduled to be held in London, UK Oct 6-8, 2016. All who are interested are welcome.

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