



World Congress on

# **Environmental Toxicology and Health**

July 11-12, 2018 Sydney, Australia

## **Scientific Tracks & Abstracts**

### **Day 1**

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**Redox water****Timothy Winey**  
Basic Research Ltd., UK

Basic Research Ltd. has developed a proprietary processed that increases water's redox potential. Because water is a polar molecule, it does respond to external (non-chemical) influences, treatments that are long-lived. Magnetism, pressure, rapid temperature fluctuations and certain frequencies of light are but a few inputs that can do and affect the physio-chemistry of water. A concrete and dramatic, manifestation of our structuring process is a simple experiment where batteries are submerged in solutions of sodium alginate (electrolysis (an experiment repeated dozens of times)). Without exception, structured samples have shown a dramatic reduction in the formation of chlorine gas. All of these factors/modes/semiconductors within cells interact with the surrounding environment and act as an electromagnetic thermal bath we call our organs or tissues. The surrounding medium is the body's semiconductors. Most of what our DNA codes are for these types of matter. Proteins are just the stage that life performs upon. What animates life is quanta of energy via compliant design. RNA codes for proteins. Proteins work in cells when they are bathed in intracellular or extracellular water. The water molecules associated with a protein can absorb a certain amount of energy. The amount of energy is tied to the amount of hydration or dehydration in this system and the energy within the hydrogen bonds and hydroxide bonds of water. Water next to hydrophilic protein polymers has special electrical interactions. The more hydrated proteins are, the more they can transfer proper amounts of energy to make biology work as it does. If they are dehydrated, the system becomes unstable, and any loss of energy, or "perturbation," to the system causes chaos and disease. Physics uses the term perturbation to describe a change to a system. Structured Sodium Alginate undergoing electrolysis at a much slower rate than unstructured controls.

**Biography**

Timothy Winey was born in Omaha Nebraska in 1966. He went on to study music (violin) and educational studies at both California State University Fresno and California State University Sacramento where he ultimately graduated. Timothy's interest in vibration led him down the proverbial "rabbit hole" of energy medicine where he began experimenting with Torsion Fields. His discovery has led to a number of findings showing anomalous Torsion effects on liquids. University and industry testing have confirmed a puzzling array of non-classical yet robust effects including: In 2015 Timothy was invited by famed University of Washington water researcher Dr. Gerald Pollack (author of the groundbreaking book "Cells, Gels and the Engines of Life") to present his research to a gathering of top scientists at the 10th annual conference on the Physics, Chemistry and Biology of Water held in Varna Bulgaria.

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**Assessment of blood lead (Pb) concentration among working women of reproductive age and children living in the vicinity of Pb battery industries in Bangladesh: A pilot study**Md Bayzidur Rahman<sup>1</sup>, Md Atikul Islam<sup>1,2</sup>, Mohammad Alauddin<sup>3</sup> and Mohammad Abul Hasnat<sup>4</sup><sup>1</sup>University of New South Wales, Australia<sup>2</sup>Khulna University, Bangladesh<sup>3</sup>Wagner College, USA<sup>4</sup>Epidemiology Resource Centre, Australia and Bangladesh

The use of Lead Acid Batteries (LAB) has sharply risen because of enhanced demand in the transport sector in Bangladesh. About 97% LABs in Bangladesh are manufactured by recycling LABs. There are ~12,207 battery recycling/recharging establishments in Bangladesh engaging ~22,480 workers including 24.6% children. Workers in these industries are exposed to lead mainly through dermal absorption and inhalation. Absorbed lead can be stored in a person's bones for years and for pregnant women it passes into the baby through blood. Lead can also be in breast milk. The pilot study examined the Blood Lead Level (BLL) among the reproductive aged women and the children under 5 to assess the level of exposure. Because the proportion of women is rapidly increasing the LAB industries in small city like Khulna (our study area) it is important to assess their current level of exposure to protect their health and the health of their babies. We recruited 62 women, 4 men and 9 children from different LAB industries including 2 controls. Our lab couldn't detect blood lead concentration >65 µg/dl. BLL data are available for 37 women, two men and 9 children. All the women working in the LAB handling shops and LAB manufacturing industry had BLL >65 µg/dl (range: 208-278) whereas the control woman had only 8.9 µg/dl. All but one child living in the vicinity of the LAB industries had BLL >55 (range: 55.2 to 240) and the control child had 20.5 µg/dl who were exposed to lead through sucking lead painted grill. Result of two men working in the LAB was available and they were >65 µg/dl. The exposure level is alarmingly high among all the exposed participants and according to CDC guidelines they should be pulled out from the work for rehabilitation.

**Biography**

Md Bayzidur Rahman was trained as an Environmental Scientist in Bangladesh before completing his PhD in Epidemiology and Biostatistics at the University of Sydney on environmental exposures and the risk of cancer. He has started working as a Lecturer in Biostatistics at the School of Public Health and Community Medicine, UNSW in January 2010 and promoted to Senior Lecturer in 2014. His research interests include multivariable methods, systematic review and meta-analysis, environmental exposure modeling and the epidemiology of cancer and environmental factors, advanced analysis of count data and analysis of data from clustered randomized trials. Since 2007, he has been working as a Consultant Biostatistician and Research Collaborator with many institutions including St Vincent's Hospital, Prince of Wales Royal Hospital for Women, The Cancer Council NSW, University of Newcastle, United Arab Emirates University and the University of Chicago.

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**Assessment of potential ecological and health risk for inhabitants living near a former secondary lead smelter**Md Atikul Islam<sup>1,2</sup>, Md Ali Akber<sup>2</sup>, Md Aminur Rahman<sup>3</sup> and Bayzidur Rahman<sup>1</sup><sup>1</sup>University of New South Wales, Australia<sup>2</sup>Khulna University, Bangladesh<sup>3</sup>Department of Public Health and Engineering, Bangladesh

Bangladesh is the most densely populated countries in the world. High demand in the transport sector has triggered the use of Lead Acid Battery (LAB) driven vehicles. Thousands of exhausted LABs are recycled in the local markets to recover lead (Pb) by crude smelting process to manufacture new batteries. Smelting is a major source of environmental metal pollution and the effect of lead smelter on the surrounding environment and people living in the affected area were rarely studied. This study assessed the concentration of Pb, As, Cd and Zn in agricultural soils and in rice grains produced in the surrounding farmlands of a former secondary lead smelter in Khulna, Bangladesh. A total of 29 surface soil and rice samples were collected within 500 m of the smelter. The contamination factor ( $C_f$ ) and total hazard quotient (THQ) was used to assess the ecological and human health risk. The mean concentrations of Pb, As and Zn in soils were 231, 6.4 and 503 mg/kg, respectively. Cd was not detected in any sample. The concentration of Pb in the surface soils near the Pb smelter was very high. Mean concentrations of Pb, As and Zn in rice grain were 7.48, 1.4 and 25 mg/kg fw, respectively. The mean concentrations of Pb and As were higher than the tolerance limits of 0.4 and 0.7 respectively, indicating a potential risk to human health. The mean value of  $C_f$  were 11.6, 2.1 and 7.4 for Pb, As and Zn, respectively. For Pb samples, 41% of the samples had  $C_f > 6$ , which means very strong contamination. In relation to health risk, THQ values for Pb and As were greater than 1.0 demonstrating high health hazards of these metals. Measures should be taken to combat metal pollution from Pb smelter in the study area.

**Biography**

Md Atikul Islam has research experience in the field of environmental pollution and public health. He has completed his Doctor of Engineering in Systems Design and Engineering from Yamaguchi University, Japan. He has worked as a Visiting Scientist in Department of Soil Amelioration, University of Zagreb, Croatia. He had several national and international collaborative research projects which mainly focus on environmental pollution assessment and management. Presently he is working as a Professor under Environmental Science Discipline in Khulna University, Bangladesh.

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**Physical development and renal functions in adolescents consuming drinking water with high content of vital cations**Aizman Roman Idelevich<sup>1,2</sup>, S A Nedovesova<sup>1</sup>, M S Golovin<sup>1</sup>, M V Iashvili<sup>1</sup>, V V Turbinsky<sup>2</sup> and E M Trofimovich<sup>2</sup><sup>1</sup>Novosibirsk State Pedagogical University, Russia<sup>2</sup>Novosibirsk Scientific Research Institute of Hygiene, Russia

The problem of population supply with drinking water of adequate quality is one of the determinants for the majority of subjects. In 2016, the 52 regions of the Russian Federation were unfavorable in respect of the mineralized drinking water that was not balanced by macro and microelement composition. It can be considered as potential risk factors in the population. Therefore, the aim of the study was to investigate the level of physical development and health as well as kidney functions in pupils of 10-12 years in long-term consumption of drinking water with high content vs. control of sodium ( $224.6 \pm 22.5$  vs.  $61.2 \pm 6.1$  mg/L), calcium ( $80.8 \pm 5.2$  vs.  $65.9 \pm 4.3$  mg/L) and magnesium ( $55.1 \pm 3.4$  vs.  $37.5 \pm 2.2$  mg/L). Evaluation of physical health of pupils and morphological parameters (Kettle index, strength of muscles, heart rate, blood pressure, reaction of the cardiovascular system to physical activity, lung capacity and vital index) showed a lower level of physical development, health and functional possibilities of the cardiorespiratory system of children consuming drinking water with high content of ions. In these pupils it has been found an increasing diuresis already in the morning background samples. After the water load (1% of body mass) in the examinees the reactivity of the renal response also increased compare to control group (it was observed a more pronounced elevation in diuresis and excretion of sodium, calcium and especially urea), which may indicate the high reactivity of osmo and ionoregulatory mechanisms. It also cannot be excluded that increased ion excretion was due to the higher their intake with drinking water and/or a decrease in the concentration of corticosteroids. The findings suggest an adverse effect of high concentrations of cations in drinking water on morphofunctional development and health of children, despite the adaptive changes of renal functions and hormonal mechanisms of their regulation.

**Biography**

Aizman Roman Idelevich is Doctor of Biological Sciences, Professor, Honored Worker of Science of Russia, Head of the Department of Anatomy, Physiology and Safety, Director of the Institute of Health and Safety. He is a Member of 3 dissertation councils for doctoral theses, a Foreign Member of the American Physiological Society, a valid Member of the European Society of Pediatric Nephrology and an Associate Editor of two scientific journals. He is author of over 500 scientific and methodical works, including 28 monographs, 90 manuals, 367 articles in refereed journals and 16 proposals, patents and registration certificates. He was awarded Diplomas of the Ministry of Education of the Russian Federation, Ministry of Emergency Situations, the Administration of the City and Region (Novosibirsk) the Medal Property of Siberia, K. D. Ushinsky Medal, etc.

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**Effect of SF-1 in maternal cadmium exposure inhibit testosterone synthesis on male offspring****Yuanyuan Huang, Jingwen Zeng, Jianlin Zhu, Yuchen Li, Wenchang Zhang and Jin Liu**  
Fujian Medical University, China

**Background:** Toxic effects of environmental reproductive toxicant cadmium on the testis have been confirmed and the toxicity of maternal cadmium exposure on the testis of offspring has become more important topic currently.

**Objective & Design:** SD female rats were treated with intra-gastric administration of cadmium (0, 0.5, 2, 8 mg/kg CdCl<sub>2</sub>) during pregnancy. After contamination, serum and testis tissue were collected from the male first (F1) and second (F2) filial generations, respectively, at PND21 and PND56. The growth and development of the testis and the serum level of sex hormone were observed. The expression of steroidogenic factors in Leydig cells was detected. The roles of SF-1 regulating the expression of steroidogenic factors in hormone synthesis and secretion and its epigenetic mechanism were explored.

**Result:** Maternal exposure to cadmium during pregnancy caused a significant decrease in serum testosterone level in male F1 offspring, an obvious inhibition in the expression of SF-1 and corticosteroid-related proteins. Epigenetics showed abnormal expression of miR-10b-5p and miR-328a-5p, which regulated StAR and SF-1 (NR5A1), respectively, confirmed by luciferase report gene assay. SF-1 mRNA expression, corticosteroid-related protein expression and serum testosterone level increased significantly in the testis of F2 offspring.

**Conclusion:** Maternal exposure to cadmium can affect testicular development of male offspring. SF-1 may regulate the expression of steroidogenic factors, which play an important role in maternal exposure to cadmium inhibiting testosterone in offspring.

**Biography**

Yuanyuan Huang is pursuing her Master's degree in Fujian Medical University, China. Her specialty is labor hygiene and environmental hygiene and her research direction is environmental molecular toxicology.

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**The air pollution caused by wildland fires and the effects on health****Jaime Senabre**<sup>1,2</sup><sup>1</sup>SINIF, Spain<sup>2</sup>University of Alicante, Spain

Wildland fires are a source of polluting emissions into the atmosphere whose main origin is anthropogenic, as is amply demonstrated by causality studies and statistics. Air pollution by such disturbance is due to combustion of forest biomass that mainly generates CO<sub>2</sub> and H<sub>2</sub>O, and other inorganic and organic gases, and particles. During fires, and by the action of fire, the ordinary characteristics of both the fuel and the oxidizer are modified, being able to change state and suffering different reactions at the molecular level. The composition and molecular structure of the combustion gases, the concentration or dose received and the exposure time act as modulators of the possible effects on the health of the exposed persons. The harmful substances of a forest fire penetrate the body, mainly through the respiratory tract and the skin. According to recent research, in Spain it is estimated that there are about 17% of the population living less than 5 km from a source that emits carcinogenic substances. There are areas of the country which has been detected excess mortality from leukemia and certain cancers, such as those related to the digestive, respiratory, prostate, breast, ovarian and gallbladder. These findings have been related to cities or municipalities with high industrial activity. There seems to be little doubt about the association of the effects of industrial pollution and the development of certain types of cancer. In our study, we evaluated the relationship between the areas of Spain with the most industrial pollution and the areas with the highest prevalence of wildland fires, in order to determine if forest fires may be contributing: First, to an impoverishment of the quality of the air we breathe; second, an increase in vulnerability and a greater risk to the health of people.

**Biography**

Jaime Senabre is a Psychologist and Environmental Consultant. He has completed his Doctoral studies in the Department of Personality, Evaluation and Psychological Treatment of the UNED. He was Chief of Brigade in a Forest Fire Service with more than 20 years of experience. He collaborates with several companies and institutions in the area of training in psychology in emergencies and human resources. He is a Professor at the University of Valencia, Director and President of the International Scientific-Professional Committee of the National Symposium on Forest Fires (SINIF). He has published articles on forest fires, stress, psychosocial risks and emotional trauma, mainly in relation to emergency services and natural disasters. Currently, he is assigned to the Research Group on Climate and Territorial Planning at University of Alicante, where he researches on the social perception of forest fire risk and behavior in the event of possible disasters.

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**The policy of task-shifting and decentralization of health services as perceived by health workers in Swaziland**Sam Mndzebele<sup>1</sup> and Sibongile Mabuza<sup>2</sup><sup>1</sup>Sefako Makgatho Health Sciences University, South Africa<sup>2</sup>University of Limpopo, South Africa

Decentralization of public health services and task-shifting are two phenomena that have been formulated into policy and adopted in many countries in order to address critical public health challenges including human-resource shortages. The attempt through this study was to add value on the policy of task-shifting and decentralization from the perspectives of health workers. An in-depth interview approach in which five Focus Group Discussions (FGDs) were conducted with 29 purposively selected health workers (mainly nurses). All the FGDs were recorded, transcribed and finally analyzed using the N-VIVO software. A total of seven thematic areas that were perceived by health workers on the concept of decentralization and task-shifting of health services were unveiled. It transpired that health workers relatively understood this health policy and that they regarded it as a positive development on the part of their communities and patients. They claimed that as a result of the policy on decentralization and task-shifting of health services, most healthcare services were now closer to the communities and that most recipients of healthcare services such as clients/patients no-longer wait in long queues to see healthcare providers in facilities. Health providers believe that now there are few chances of their clients/patients being lost to care and that there is improved service delivery in most healthcare facilities. On the other hand, the health workers perceive this policy as a challenge to the health sector in terms of its implementation coupled with inadequate resources such as material supplies, infrastructure, manpower-shortage and insufficient drugs. These findings suggest that there are a number of public health systems and policy issues that form a core of the experiences and perceptions of health workers in relation to the policy on decentralization and task-shifting of health services. According to health workers, these health systems and policy issues can be categorized as either positive or negative developments for the health sector.

**Biography**

Sam Mndzebele is a Senior-Lecturer at Sefako Makgatho Health Sciences University, South Africa, School of Public Health. He has completed his graduation from the University of South Africa with a PhD in Public Health Research Studies. He has completed his graduation with a Bachelor of Education (BEd) from the University of Swaziland in 1998. In 2003 he has obtained both his Master's degree and Postgraduate Diploma in Public Health under the Bristol Myers-Squibb Foundation.

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## **Scientific Tracks & Abstracts**

### **Day 2**

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**Personalized and Precision Medicine (PPM) as a model of healthcare of the newest generation towards translational applications to move ahead as a global international team**Sergey Suchkov<sup>1,7</sup>, Jeff Skolnick<sup>10</sup>, Mariya Studneva<sup>1,6</sup>, Marc Hendrikx<sup>8</sup>, Arsenii Sadykov<sup>2</sup> and Paul Barach<sup>9</sup><sup>1</sup>I M Sechenov First Moscow State Medical University, Russia<sup>2</sup>Moscow Engineering Physical Institute, Russia<sup>3</sup>A I Evdokimov Moscow State Medical and Dental University, Russia<sup>4</sup>International Standard for Phytosanitary Measures, Japan<sup>5</sup>PMC, USA<sup>6</sup>EPMA, EU<sup>7</sup>AHA, USA<sup>8</sup>Hasselt University, Belgium<sup>9</sup>Wayne State University School of Medicine, USA<sup>10</sup>Georgia Institute of Technology, USA

A new systems approach to diseased states and wellness result in a new branch in the healthcare services, namely, Personalized Medicine (PM). To achieve the implementation of PM concept into the daily practice including clinical cardiology, it is necessary to create a fundamentally new strategy based upon the subclinical recognition of bioindicators (biopredictors and biomarkers) of hidden abnormalities long before the disease clinically manifests itself. Each decision-maker values the impact of their decision to use PM on their own budget and well-being, which may not necessarily be optimal for society as a whole. It would be extremely useful to integrate data harvesting from different databanks for applications such as prediction and personalization of further treatment to thus provide more tailored measures for the patients and persons-at-risk resulting in improved outcomes whilst securing the healthy state and wellness, reduced adverse events and more cost effective use of health care resources. One of the most advanced areas in cardiology is atherosclerosis, cardiovascular and coronary disorders as well as in myocarditis. A lack of medical guidelines has been identified by the majority of responders as the predominant barrier for adoption, indicating a need for the development of best practices and guidelines to support the implementation of PM into the daily practice of cardiologists. Implementation of PM requires a lot before the current model physician-patient could be gradually displaced by a new model medical advisor-healthy person-at-risk. This is the reason for developing global scientific, clinical, social and educational projects in the area of PM to elicit the content of the new branch.

**Biography**

Sergey Suchkov has obtained his PhD and Doctor's degree and later was working for Helm-holtz Eye Research Institute and Moscow Regional Clinical Research Institute.

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**Measuring forest resilience and exploring tipping point behavior****Chuixiang Yi, George Hendrey, Peipei Xu, Guangwei Mu and Wei Fang**  
Queens College-City University of New York, USA

Forests provide an important ecological service by partially balancing the global carbon budget, sequestering about one quarter of anthropogenic emissions (2.4 GT C per year). However, several forest biomes are subject to increasing stress and tree mortality due to invasive pests, drought and fire and these appear to be exacerbated by climate change. A question arising for forest managers and policy makers is how to anticipate and deal with the acceleration of forest stress and mortality with on-going warming climate. To provide a baseline to which anticipated changes may be compared. We will attempt to answer the following questions: (1) how can we quantify and measure forest resilience to climate related stresses? (2) what trends or patterns in climate are indicative of sufficient stress as to push forests past a key control to forest tipping point leading to a change in the type of ecosystem? and (3) can we define such tipping point behaviors of forests? We have explored these questions by using tree-ring data, remote sensing images, eddy flux tower data and nonlinear stability theory. Here we report some initial results along with the pilot-studies.

**Biography**

Chuixiang Yi has served as an Associate Professor at Beijing Normal University, China. He has accumulated 10 years of Post-doctoral research experiences in the USA across many campuses, including UC, Berkeley, University of Minnesota, Pennsylvania State University, and University of Colorado. He is presently an Associate Professor at Queens College, City University of New York. He is a Micrometeorologist and Theoretical Modeler studying how climate change affects the carbon cycle and ultimately how these changes to the carbon cycle may alter our environment and further alter our climate in the future.

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**Role of endocrine disturbing chemicals in development of autism spectrum disorders****Omar Bagasra**

Claflin University, USA

Autism Spectrum Disorder (ASD) is a set of complex developmental disorders whose etiology is unknown. Although the symptoms may vary from person to person, they include impairment or loss of speech, lack of empathy and social interaction deficiency. The cases of ASD have continued to increase drastically each year, with the CDC estimating 1:45 children diagnosed, from 1 in 10,000 40 years ago. It is believed that the ASD is caused by a combination of genetic and environmental factors, but recent studies suggest that epigenetic factors as well as exposure to endocrine disturbing environmental chemicals, to which expecting mothers are exposed on a daily bases, may play a critical role in its pathogenesis. Although there are no biomarkers for the disease, low levels of Oxytocin (OXY) and Arginine Vasopressin (AVP) have been reported. These neuropeptides play a critical role in neurodevelopment of social interaction. Social interaction deficiencies are a principal sign of ASD in children. OXY, is involved in social recognition, pair bonding and anxiety, as well as being linked to autism. Numerous studies have shown that children with autism have plasma levels of OXY and AVP that are significantly lower than average. The importance for normal OXY and OXY receptor function in males may explain how hormonal malfunction leads to ASD male bias. Also, mothers of ASD children have lower levels of OXY and AVP and, in typical children, lower concentrations of OXY in plasma are associated with lower social and cognitive functioning. There is an inexplicable bias toward males in classical autism by a ratio of ~4:1, and ~10:1 in Asperger's Syndrome (AS). The clinical picture is very heterogeneous and the etiology is unknown. The heritability is high in ASD but no individual gene variants exerting a major impact on susceptibility have as yet been identified. The mechanism for gender bias in autism is unknown although several hypotheses have been advanced including: (1) Epigenetic mechanisms 'the extreme male brain' hypothesis of Baron-Cohen which postulates that elevated fetal testosterone is a risk factor for ASD, (2) genetic mechanisms which involves X or Y chromosome inactivation and (3) recently, Hu, et al. have shown that retinoic acid-Related Orphan Receptor Alpha (RORA) is reduced in the brain and lymphoblastoid cell lines of multiple cohorts of individuals with ASD. This gene targets CYP19A1 (aromatase), in a gender-dependent manner that can also lead to elevated testosterone (or male hormones-like chemicals) levels, a proposed risk factor for autism. To date, none of these hypotheses have been either proven or disproven. Given the high clinical heterogeneity of ASD, it is possible that each of these mechanisms for gender bias may apply to specific cohorts of individuals with ASD. We will present data on the neuro-modifying effects of several endocrine disturbing chemicals on developing human brain neurons and their effects at morphologic, immunologic and at molecular levels.

**Biography**

Omar Bagasra has completed his PhD from University of Louisville, Kentucky, USA and his MD from UACJ, Mexico. He has completed his Post-doctorate at Union University, Albany, New York and Residency and Fellowships at Hahnemann University, Temple University, Schools of Medicine. He is the Founding Director of South Carolina Center for Biotechnology at Claflin University, South Carolina, USA. He has published more than 140 papers in reputed journals and published over 10 books. His recent book describes the role of environmental factors in autism. He has been serving as Editorial Board Member of over 15 journals.

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## ENVIRONMENTAL TOXICOLOGY AND HEALTH

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**Physicochemical parameters and planktonic diatoms as indicators of toxicity in surface water body, Nairobi Dam, Kenya**

Shyam Manohar

Kenyatta University, Kenya

Clean air, water and food are natural God given gifts to all humans and also to all micro and macro-organisms inhabiting on this living planet. If one of these necessities is contaminated with chemicals more than the tolerance level(s) become toxic and create serious health problems for life. Water quality of any natural or manmade aquatic ecosystem mainly depends on the type(s), density and frequency of organism's species composition, growth, productivity, distribution and stratification; seasonal water level fluctuations, flow rate, number of inlets and outlets with volume of water; interactions between biological, physical, geology; types of chemical(s) contamination, their characteristics and anthropogenic activities within surroundings of freshwater resource(s). Planktonic species and physicochemical parameters were studied within Nairobi Dam at five selected sampling stations (S1 to S5) during dry season from June to September 2017. There are 15 genus which are *Amphora*, *Aulacoseira*, *Closterium*, *Cyclotella*, *Cymbella*, *Diatoma*, *Fragillaria*, *Gomphocymbella*, *Navicula*, *Nitzschia*, *Peridinium*, *Pinnularia*, *Stephomodiscus*, *Surillela* and *Synedra* composed of 23 planktonic species. Out of four species of the genus *Nitzschia*, three species *N. lucastris*, *N. palea*, *N. recta* together with *Cymbella cistula* and *Diatoma hiemale* have 100% frequency and well adapted within wide range of high nutrient levels in all samples but *Nitzschia subacicularis* appeared with 60% frequency. Other five genus with two species each are *Aulacoseira ambigua*, *A. schroidera*; *Cyclotella ocellata*, *C. kutzinghiana*; *Diatoma elongatum*; *D. hiemale*; *Fragillaria aethiopica*; *F. longissimi*; *Synedra cunningtonii*, *S. ulna* but another nine genus with single species are *Amphora ovaris*, *Ceratium sp.*, *Gomphocymbella beccari*, *Peridinium sp.*, *Cymbella cistula*, *Navicula granatum*, *Pinnularia viridis*, *Stephomodiscus astraca* and *Surillela ovalis*. Mean monthly values of selected physicochemical parameters are: temperature  $25.44 \pm 0.63$  °C, flow rate  $2.38 \pm 0.07$  km/h, pH  $8.36 \pm 0.13$ , dissolved oxygen  $2.95 \pm 0.6$  mg/L, electrical conductivity  $671.43 \pm 222.2$   $\mu$ s/cm, Turbidity  $113.13 \pm 13.86$  NTU, carbonates  $146.91 \pm 25.64$  mg/L, total nitrogen  $654.97 \pm 214.6$   $\mu$ g/L, total Phosphorus  $990.95 \pm 27.24$   $\mu$ g/L, Sulfates  $12.51 \pm 0.82$  mg/L and chlorides  $10.31 \pm 0.83$  mg/L. Study revealed that only pH, dissolved oxygen and carbonates show significant difference ( $p \leq 0.05$ ) in Nairobi Dam water but rest of physicochemical levels of conductivity, turbidity, total nitrogen, total phosphates, sulfates and chlorides are higher than recommended levels in drinking water according to EU, WHO and Kenya Bureau of Standards (KEBS). Based on the results, it is concluded that water is hard and due to high nitrogen level it limits the oxygen carrying capacity of red blood cells and infants may suffer with methemoglobinemia (blue baby syndrome) health problem and even noncarbonated hardness due to presence of high levels of  $Cl_2$ ,  $SO_4$  and  $NO_3$ , the water of the dam is slightly toxic. Therefore, without proper municipal water treatment system, it must not be supplied to human population, for animal drinking and should not be used even for aquaculture. During field observations, color, odor, presence of planktonic species, their density and frequency should be used as bio-indicator for quick water quality assessment of freshwater ecosystem(s).

**Biography**

Shyam Manohar is a Professor of Environmental Science at Kenyatta University, Kenya and has obtained his PhD (1974) from Institute of Science, University of Bombay He has completed his BSc majoring in Botany, Chemistry and Zoology, MSc (Botany) from University of Meerut, India and was a Senior Scientific Officer at Indian Council of Agricultural Research (ICAR), New Delhi. He has conducted research on floristic and phyto-sociological studies of the north and south arid and semi-arid regions of India.

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July 11-12, 2018 Sydney, Australia

**Health risks associated with high level of nitrate in water and its removal by adsorption on organic-inorganic hybrid bio-composites**Wondalem Misganaw Golie<sup>1</sup> and Sreedevi Upadhyayula<sup>2</sup><sup>1</sup>Defence University College of Engineering, Ethiopia<sup>2</sup>Indian Institute of Technology Delhi, India

Anthropologic activities including industrialization and agricultural practices contributed immeasurably to the imbalances in the nitrogen cycle and resulted in alarmingly increased levels of nitrate in drinking water sources and other water bodies, imposing a serious threat to human health and contributing to eutrophication. High nitrate concentrations in drinking water sources can lead to a potential risk to public health causing methaemoglobinaemia and cancer. Among the unit operations in water treatment, adsorption occupies an important position since it is an efficient and economically feasible process for nitrate removal from water. Chitosan is the promising adsorbent material due to low cost, biocompatibility, biodegradability and non-toxicity. In this study, chitosan based organic-inorganic hybrid bio-composites, such as chitosan/bentonite, chitosan/titanium oxide and chitosan/alumina (ChBT, ChTi and ChAl, respectively) were prepared and characterized. Stability of bio-composites significantly increased with crosslinker and inorganic dosage. Adsorption capacities considerably decreased at higher crosslinker dosage. The rate of adsorption rates were higher at the initial stages and decreased in the later stages due to the decrease in concentration gradient with time and equilibrium adsorption was established beyond 120 min. The adsorption capacity increased drastically with the increase in initial nitrate concentration. Higher equilibrium adsorption capacities were obtained in the pH range of 4-8. At optimum operating conditions, the actual adsorption capacities of ChBT, ChTi and ChAl were 35.68 and 43.62, and 45.38 mg/g as nitrate, respectively. Adsorption capacities increased with the increased temperature in the range 283 K to 313 K and decreased above 313 K. Regeneration study shows ChBT, ChTi and ChAl reusable adsorbent to nitrate removal from water. Among the three adsorbents, ChAl has shown highest stability and performance in all operating conditions.

**Biography**

Wondalem Misganaw Golie has completed his PhD in Chemical Engineering from Indian Institute of Technology Delhi, New Delhi, India in October 2017. His research interest includes separation and purification technology, reaction engineering, environmental engineering, environmental chemistry, environmental biotechnology, pollution control, water and wastewater treatment, adsorption and bio-sorption, applications of biopolymers, biocomposites and smart materials in environmental engineering.

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