

ILSI India Webinar on Nutrition and Cognition



International Life Sciences Institute India

Webinar Series on Brain Health

First Webinar: Nutrition and Cognition

By
ILSI India Task Force on
Nutrition & Brain Health –NABHI

Date: March 26, 2021
Time: 11.00-13.45 Hrs.
Web Platform: CISCO Webex

Compendium of Abstracts & CVs

ILSI India Webinar on Nutrition and Cognition

Prof. K N Agarwal

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BRIEF CV

Prof K N AGARWAL MD (Sweden), MD (Delhi), was trained in the Departments of Pediatrics, University Hospital, Uppsala, SWEDEN and Maulana Azad Medical College, New Delhi, INDIA. He worked as Chairman in Pediatrics Institute of Medical Sciences, Varanasi (1971-1990) and University College of Medical Sciences, Delhi (1994 to 2002). He served as Director, S.G.PGI, Medical Sciences during 1990-1993, and later as Director Dean, Institute Medical Sciences, Varanasi. He was elected Fellow of the Indian National Science Academy in 1994. He has been Honorary Scientist, Indian National Science Academy (2006-2010); and Faculty in Pediatrics in University of Delhi in 1964-1971 and 1994-2000, and Institute of Medical Sciences Varanasi 1971-1990 and 1994. Dr. Agarwal was awarded Center of Excellence in Growth & Development by the Indian Council of Medical Research. He has published 357 scientific papers in indexed journals; guided 30 PhD scholars, published 7 research monographs and 5 books. He is recipient of several awards and international and national grants.

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Dr B.Sesikeran MD

Chairman , K-FFIG
Former Director
National Institute of Nutrition (ICMR)
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BRIEF CV

Dr. Sesikeran is Chairman of Governing Council of ILSI India Knowledge Center on Functional Foods, Immunity and Gut Health (K-FFIG) – a center of excellence launched in 2020. He is the Former Director of NIN, ICMR Hyderabad. He is a Pathologist by training and has carried out research in the area of Nutrition, Food Safety, and Toxicology for 30 years. He has over 120 publications and Chapters in 3 Books. He has developed guidelines for Probiotics in foods, Guidelines for GM food safety, Guidelines for Biosimilar Drugs, Recommended Dietary Allowances and Dietary Guidelines. He was the Director NIN between 2006 and 2012. He is a Fellow of the National Academy of Medical Sciences and Fellow of the International Medical Scientists Academy. He is Fellow of AP & Telangana Academies of Sciences. Past President Nutrition Society of India. He is Public Trustee of ILSI India. Member Governing Body of Nutrition Foundation India, Member- Advisory Council on Science -Coca Cola India. Member Scientific Advisory Committee Gut Microbiota and Probiotic Science Foundation (India). He is also the Chairman of the Scientific Advisory Committee of PFNDAI.

Early Life Nutrition Deprivation and Mental Functions

By

**Prof. Agarwal KN, Department of Pediatrics, Institute of Medical Sciences,
Banaras Hindu University, Varanasi**

Prof. Agarwal DK , Prof. Upadhyay SK and Prof. Agarwal S
Department of Pediatrics, Institute of Medical Sciences, Banaras Hindu University, India
Pediatric Neurologist Children's Hospital of Philadelphia, USA

Presented By

Dr. B. Sesikeran, Director (Retd.), National Institute of Nutrition (ICMR)

ABSTRACT

Babies born of rural undernourished mothers, showed inter and intra hemispheric asymmetry and abnormal paroxysmal discharges, suggesting dysmaturity of brain. The under nutrition, in early life showed impaired growth as well as the conceptual and sensory development. Primary school children (6-8 years) developed impaired intelligence particularly for performance tasks. The stunted wasted children showed persistence of 'Soft Neurological Signs' with EEG changes. Those with I.Q. >90 had learning disabilities. Nutrition supplement for 2 years, in 6-8-year rural children made partial improvement, only. These children in school age (adolescence) had : a) to mobilize muscle amino acids to maintain their body functions, b) persistence of soft neurological signs, c) deficit in higher mental abilities , d) prolonged reaction time and e) brain MRI showed that both the frontal lobes reduced in size with loss of asymmetry. Anemia affected placenta, fetus, and brain functions with irreversible changes in neurotransmitters.

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Dr Sylvia Fernandez Rao
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BRIEF CV

Dr Sylvia Fernandez Rao is currently working as Scientist-D in ICMR-National Institute of Nutrition, Hyderabad. She holds a PhD in Psychology and has extensive research experience in the domain of Infant and Young Child Feeding (IYCF) Practices, Child Development since more than a decade. She is associated with several pioneering research work on behavioural nutrition, maternal & child health, RCTs on micronutrient supplementation in rural and tribal population of India. She is involved in several national and international collaborative research projects.

Role of Nutrition and Inflammation on Ageing Brain

By

**Dr Sylvia Fernandez Rao, Head, Nutrition and Cognition,
ICMR-National Institute of Nutrition**

ABSTRACT

Age is associated with an increased risk of various disorders, including dementia, cardiovascular disease, atherosclerosis, obesity, and diabetes. Aging reduces the brain's potency. While not all brain processes are equally affected, the detriments are serious and broad enough to adversely affect the quality of life for millions of people, from slower processing speed to poor recall. Aging also poses a risk of accumulating even more severe conditions, such as Alzheimer's disease and related dementias. Just as processes that incorporate neural function decline in a variable manner with age, subsets of neural changes govern cognitive decline, such as decreased excitatory synaptic plasticity, increased neuroinflammation. However, the biological causes of age-related cognitive decline are still not fully understood. Several inflammatory processes, inflammation in the context of aging (inflammaging), low-grade chronic inflammation (metaflammation) and neuroinflammation effect brain function. There is evidence, albeit inconclusive, of a protective association between certain nutrients (e.g., folate, flavonoids, vitamin D and certain lipids) or diets (Mediterranean) and cognitive outcomes in the elderly. For certain nutrients and food groups, protection may be increased in individuals with nutrient deficiencies or genetic predisposition to cognitive impairment. That's a future area of research. In addition, microbial composition, diversity and various metabolites were associated with different metabolic and cognitive characteristics. These studies led to the identification of characteristic microbiota profiles and changes in microbial genetic richness in association with cognitive function. In cross-sectional and longitudinal studies, there has been a decrease in attention, mental agility and executive function associated with a microbiota ecosystem. Nonetheless, evidence in humans remains scarce and causal relationships may not yet be inferred. This requires larger, long-term studies to better understand the possible role of microbiota in human cognition. Use of advanced technologies for nutrition assessment (e.g., innovative methods of dietary intake assessment) and recently identified biomarkers of nutrition and neurobiological outcomes will be important to achieve this goal.

India is poised to experience a large increase in the burden of dementias and cognitive decline associated with aging. Some studies (limited geographic locations) show that nearly 50% of the tested seniors have mild cognitive decline. Nationally representative epidemiologic data, through geriatric assessment of nutrition and cognition, are critical to appropriate interventions to improve quality of life and disease burden.

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Prof Pravat Kumar Mandal
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BRIEF CV

Prof. Pravat Kumar Mandal has done Ph.D from Indian Institute of Technology, Madras. He Director-in-Charge Neurospectroscopy and Neuroimaging Laboratory, National Brain Research Centre. At present he is also officiating as Acting Director of National Brain Research Center.

He has written 40 articles in Journals.

Neuroimaging to Explore the Impact of Nutrition on the Ageing Brain

By

Prof. . Pravat K Mandal
Acting Director, National Brain Research Center
Manesar, Gurgaon, India

&

Honorary Professor, Florey Institute of Neuroscience and Mental Health,
Melbourne, Australia.

ABSTRACT

Neuroimaging is an important non-invasive technique to investigate brain structure and neurochemical profile. Magnetic resonance spectroscopy (MRS) is specifically important to investigate neurochemicals like N-Acetyl aspartate (NAA), antioxidants (Glutathione), various neurotransmitters (GABA, Glutamate/Glutamine), energy metabolites (ATP) and also pH level. Recent research has indicated that brain GSH level in various brain regions are correlated with cognitive profile as validated from neuropsychological studies. Impact of proper nutrition on these critical neurochemicals can be measured and quantified by MRS. The brain generates energy primarily from glucose metabolism, and in starving conditions from ketone bodies like acetate or hydroxybutyrate. The products of metabolism of these key fuels can be detected using the technology of ¹³C MRS, a modality that detects the resonances from ¹³C isotope of carbon. Perturbations in the concentration of various metabolic products like lactate, glutamate/glutamine/GABA, myo-inositol, NAA etc. can provide great insights into the neurochemistry of the brain. This in turn can help in the prognostication of various diseases that can be implicated in the case of an impaired glucose metabolism. This presentation will highlight the application of multinuclear MRS spectroscopy to monitor brain stress level and pH in healthy old and diseased brain using 3T MRI scanner. These studies can be extended to monitor the brain stress level under various supplementation.

ILSI India Webinar on Nutrition and Cognition

Dr Seema Puri

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BRIEF CV

Dr Seema Puri, PhD has over 35 years of teaching and research experience in several areas of Foods and Nutrition including young child nutrition, NCDs and geriatric nutrition. She has been an invited speaker at numerous International conferences; has over 60 publications to her credit. She is coauthor of a popular Textbook on Nutrition and Dietetics.

She has been conferred Distinguished Services Award by Geriatric Society of India in 2010 and for her significant contribution to Nutrition and Dietetics in 2014.

She is a member of several national/ international groups for research and advocacy in nutrition. She is also a member of FSSAI Scientific Panels on Labeling, Claims and Advertisements and on Nutraceuticals and Dietetic Products. She was the National Vice President of the Indian Dietetic Association (2015-2018) and is presently Executive Council member of the Nutrition Society of India.

Lifestyle and Brain Health

By

**Dr Seema Puri, Assoc Professor,
Institute of Home Economics, University of Delhi**

ABSTRACT

Brain health refers to how well a person's brain functions in the domains of cognitive health involving, motor, emotional and tactile functions. Multiple factors affect brain health such as age-related changes in the brain, injuries, mood disorders, substance abuse, and diseases; while some cannot be changed, many lifestyle factors can be modified. Lifestyle factors include diet, physical activity/exercise, social and mental activity, smoking, alcoholism, sleep, metabolic disorders, maternal stress, depression, violence, and socio-economic factors.

Poor fitness in early adulthood is associated with higher cognitive decline and increased risk for early onset dementia later in life. Individuals with greater educational and occupational attainment, those with higher IQ, and those who undertake complex mental activity later in life are at lower risk of dementia and show slower cognitive decline. Social isolation and subjective loneliness are risk factors for cognitive impairment and dementia among older people. Smoking, alcoholism and poor sleep patterns also contribute to cognitive decline.

Evidence exists to support the 'whole diet approach' is beneficial for brain health. Mediterranean diet is associated with better cognitive function and reduced risk of Alzheimer's. Various dietary factors alone and in combination, particularly omega-3 fatty acids and vitamin D, are protective against cognitive decline and dementia. Food insecurity and malnutrition are linked directly to nutritional deficiencies, which in turn adversely affect learning and result in developmental deficits among vulnerable infants and toddlers.

Strategies include optimizing of diet through neonatal periods as well as later in life, reducing behaviors such as smoking and the early detection and treatment of reversible causes of cognitive impairment throughout life.