SESSION I

Clinical and translational neuroscience research in autism: Challenges and strengths with a focus on electrophysiology

Dr. Sowmyashree Mayur Kaku & Dr. Petrus J de Vries

July 6, 2023 // 9:00 am ET

Course Materials

The purpose of these materials is to help provide an introduction to the INSAR Institute session. The materials were designed to prepare students and trainees who are unfamiliar with this research with the general background to receive the most educational benefit from the session. Toward this objective, we have prepared the following: (1) learning objectives for this session, (2) key terms and concepts, (3) a selection of recommended resources. These materials are considered supplemental to the presentation. Register for this webinar and other sessions in this series at: https://www.autism-insar.org/page/Institute2023

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Learning Objectives

The INSAR Institute for Autism Research was established in direct response to requests from students and trainees for multidisciplinary training opportunities. The INSAR Institute team is also working to engage stakeholders. The INSAR Institute's priorities are to provide a (1) freely available, (2) multidisciplinary training platform for young scientists and others from various backgrounds that (3) allows for international participation.

The overarching goal of the INSAR Institute is to expose junior scientists to topics they are not currently engaged in, with the hope that basic scientists and clinical scientists may learn from each other to ultimately advance the understanding of autism. This year, the series is aimed at adopting a global perspective to showcase similarities and differences in the process of conducting autism research across a number of geographic locations and fields of research, including neuroscience, psychology, and public health.

This session, on Clinical and translational neuroscience research in autism: Challenges and Strengths, with a focus on electrophysiology, is presented by Dr. Sowmyashree Mayur Kaku (MBBS, Ph.D.) and will be discussed by Professor Petrus De Vries. *At the conclusion of this session, participants will:*

1. **Identify** the strengths and challenges of conducting clinical and translational neuroscience research in an Lower-Middle-Income Country (LMIC) setting.

2. **Learn about** the work done during the COVID-19 pandemic and the adaptations we made as an advanced clinical and research set-up in India for clinical assessments, follow-ups, early interventions, and research methods.

3. **Understand** the clinical profile, protocols derived, technical challenges and the role of electrophysiology in autism research from clinical and translational lenses.

Key Terms

Clinical neuroscience. The study of Clinical Neuroscience is centered around using principles and techniques from neuroscience, psychology, and medicine to comprehend and manage neurological and psychiatric disorders in clinical settings. This field aims to advance our knowledge of the brain and its disorders and create effective patient treatments (Insel & Quirion, 2005).

Contextual barriers. Contextual barriers are communication barriers that arise when the context in which words are used by one person is different from the context in which such words are used by another. These could be influenced by morals, values, domain knowledge, or culture among other things.
(https://wikieducator.org/Life_Skills_Development/Module_Three/Unit_1:_The_Approach_to_Communication/Barriers)

Cultural factors. Culture encompasses the set of beliefs, moral values, traditions, language, and laws (or rules of behavior) held in common by a nation, a community, or other defined group of

people. Culturally determined characteristics include: the language spoken at home; religious observances; customs (including marriage customs that often accompany religious and other beliefs); acceptable gender roles and occupations; dietary practices; intellectual, artistic, and leisure-time pursuits; and other aspects of behavior. (https://www.encyclopedia.com/education/encyclopedias-almanacs-transcripts-and-maps/cultural-factors)

Electrophysiology. Electrophysiology studies the electrical properties and functions of living cells, mainly excitable cells like neurons and muscle cells. This branch of physiology analyzes the electrical signals generated by these cells and their role in various physiological processes (Carter & Shieh, 2015).

LMIC country. Lower-middle-income economy countries are those with a GNI (Gross National Income) per capita between $1,086 and $4,255 per the classification assigned to countries by the World Bank. The latest classification positions 137 countries in the LMIC categories, representing 63% of countries in the world (Lencucha & Neupane, 2022).

Translational neuroscience. Translational neuroscience is a field of neuroscience that concentrates on utilizing basic scientific discoveries and knowledge obtained from laboratory research to develop practical applications for diagnosing, treating, and preventing neurological disorders and diseases in clinical settings. Its goal is to connect fundamental neuroscience research with clinical practice, bringing scientific advancements closer to helping patients (Davies et al., 2019).

References for Key Terms

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Davies, C., L Hamilton, O. K., Hooley, M., Ritakari, T. E., Stevenson, A. J., & W Wheater, E. N. (2019). Translational neuroscience: The state of the nation (a PhD student perspective). Brain Communications, 2(1). https://doi.org/10.1093/braincomms/fcaa038

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Recommended Readings & Resources

Kaku, S. M. (2022). Mental health of children with neurodevelopmental disorders during COVID-19: A brief report of family experiences from a low and middle income country. *Clinical Child Psychology and Psychiatry*, *27*(1), 269–277. https://doi.org/10.1177/13591045211026058

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Santosh, S., N.D, A., Lakshmi, P. S., Kaku, S. M., Srikanth, N., & Ashok, M. V. (2022). Implementing early intervention for autism in India - Current status. *Indian Psychiatric Update, Rehabilitation Psychiatry, Indian Psychiatric Society South Zonal Branch, 5*, 147-162. ISBN: 978-93-5680-270-4.

Sarma, G. R. K., Kaku, S. M., James, M. W., & Mysore, A. (2021). Utility of prolonged EEG in Autism Spectrum Disorder with and without epilepsy. *Abstracts. Epilepsia, 62,* 325-325. https://doi.org/10.1111/epi.17079