

Department of Chemistry, IIT Madras  
Ph.D. Research Colloquium  
(2<sup>nd</sup> Seminar)

**Association between Environmental Chemicals and Non-Communicable diseases in Rural India**

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Venue: CB 310

Date: 12.12.2019

Time: 3:00 pm

The prevalence of diabetes and non-communicable diseases has increased alarmingly in India over the past decade. Epidemiological studies have largely focussed on traditional risk factors like diet, physical activity and lifestyle<sup>1</sup>, both in terms of understanding the disease as well as governmental policies for prevention of this burden. There is now a growing body of evidence for the role of environmental endocrine disruptors especially heavy metals and pesticides, in the aetiology of diabetes and vascular diseases. Among these environmental chemicals, pollution due to industries, traffic and smoking are compartmentalized to relatively small exposure groups but the agrochemicals like synthetic fertilizers and pesticides pose a far higher risk for a larger group through the food chain. Our aim was to explore the association between environmental disruptors, especially pesticides and heavy metals with diabetes and atherosclerosis in a rural farming village. Nallampatti, a typical farming village, was selected for our study and the population was screened using a questionnaire, anthropometry, blood pressure measurements, blood investigations, serum pesticides and urine heavy metals. We found a high prevalence of pre-diabetes, diabetes and atherosclerosis in this farming population<sup>2</sup>. In addition, we showed that increasing quartiles of arsenic levels in urine had an association with prevalent diabetes and atherosclerosis, after adjustment of confounding factors<sup>3</sup>. Our results also suggest that co-accumulation of pesticides and arsenic may have an association with diabetes and atherosclerosis. Further large scale, longitudinal follow up studies are needed to confirm this hypothesis.

**References**

1. Anjana RM, Pradeepa R, Deepa M, et al, The Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study: methodological details. *J Diabetes Sci Technol.* 2011 Jul 1;5(4):906-14.
2. Swaminathan K, Veerasekar G, Kuppasamy S, Sundaresan M, Velmurugan G & Palaniswami, N.G. (2017) Noncommunicable disease in rural India: Are we seriously underestimating the risk? The Nallampatti noncommunicable diseases study. *Ind. J Endocrinol. Metab.* 21: 90-95.
3. Velmurugan G, Swaminathan K, Veerasekar G, Purnell JQ, Mohanraj S, Dhivakar M, Avula AK, Cherian M, Palaniswami NG, Alexander T, Pradeep T. (2018). Metals in urine in relation to prevalence of pre-diabetes, diabetes and atherosclerosis in rural India. *Occup. Environ. Med.* 75: 661-667.

Guide

Prof. T. Pradeep

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*10-12-2019*

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