

# Hanson 先生 講演会案内

## The Developmental Origins of Health and Disease (DOHaD): from epigenetic mechanism to public health opportunities

### DOHaD\* (ドーハッド) からみた生活習慣病発症機序 - 次世代の健康とエピジェネティクス - (\*Developmental stage: 胎生期、乳幼児期)

**演者 : Prof. Mark Adrian Hanson**

The president of the International DOHaD Society.

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More than 400 publications in the area of cardiovascular medicine and developmental  
science-

日 時 : 平成 27 年 9 月 28 日 (月) 18:00~19:00 (17:30 開場)

会 場 : 東京大学 医学部教育研究棟 14 階 **鉄門記念講堂**  
(都営大江戸線「本郷三丁目駅」、東京メトロ南北線「東大前駅」より徒歩)  
〒113-8654 文京区本郷 7-3-1

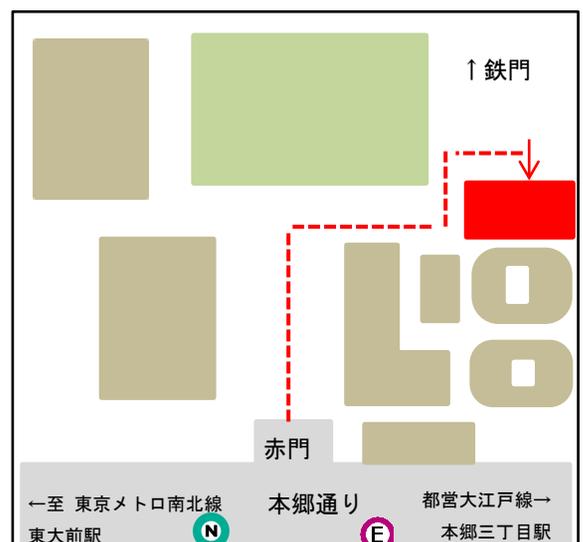
参加費 : 無料

主 催 : 東京医学会

共 催 : 東京大学医学部  
産婦人科学教室、糖尿病代謝内科学  
循環器内科学、小児科学、発達医科学、  
日本 DOHaD 研究会

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## **The Developmental Origins of Health and Disease: from epigenetic mechanisms to public health opportunities.**

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Non-communicable diseases (NCDs) including cardiovascular disease, diabetes, chronic lung disease and some forms of cancer pose an increasing threat to global health and the economies of both developed and developing countries, because the mortality they cause is greater than that from communicable diseases. Risk is passed across generations, but is not caused primarily by fixed genetic variations. Recent changes in nutrition, physical activity and health behaviours associated with an urban, Westernised lifestyle are important, but attempts to reduce NCD incidence through adult lifestyle are not succeeding.

Research in Developmental Origins of Health and Disease (DOHaD) has shown that risk of NCDs is set in part during early development, when environmental influences including mother's diet, body composition, behaviours such as smoking and exposure to some environmental chemicals affect the development of her fetus and newborn, establishing its responses to later environmental challenges such as an obesogenic lifestyle. Paternal exposures and lifestyle can also produce developmental effects via the sperm. If the cues which the developing embryo and fetus detect are inaccurate, e.g. unbalanced maternal diet or because nutritional transition occurs between generations through rapid economic improvement or migration, the offspring's responses are mismatched to later challenges, leading to greater risk of NCDs. Whilst undernutrition remains an enormous problem throughout the developing world, in both developing and developed societies adverse consequences of over- and under-nutrition co-exist. The resulting risk of NCDs can be transmitted down multiple generations. The consequences affect many aspects of disease risk across the life course including the metabolic syndrome, reproductive health, behavioural and cognitive problems, osteoporosis, sarcopenia and some allergic conditions.

DOHaD research has now indicated underlying mechanisms, many of which involve epigenetic processes, including DNA methylation, changes in histone protein structure and small non-coding RNAs. New evidence is revealing how such processes, which extend beyond imprinted genes, can modify the effects of transcription factors on gene expression and thus responses to later lifestyle challenges. The specific patterns of CpGs methylated are important, and the regions involved are not solely CpG-rich islands or shores. There is also increasing evidence showing the importance of fixed genetic/epigenetic interactions. Epigenetic changes can serve as markers of prenatal development which may give better insights than birthweight, and can be early markers of later risk as they are in principle reversible by dietary, endocrine or pharmacological means.

DOHaD insights indicate new opportunities to develop interventions to reduce NCD risk. A particular focus is needed on the preconception period, especially in adolescents and young people who do not routinely access health care. Groups of lower socioeconomic status or educational achievement are at particular risk, as are migrants and displaced populations. Addressing the challenge of NCDs requires new global initiatives to promote health literacy and healthy lifestyle in parents-to-be and their children, but these must be adapted to be feasible and sustainable in specific countries.