DOHaD and Epigenetics

This session explored the relationship between genetics and epigenetics and the effects on offspring phenotype. Epigenetics is defined as changes in the genome that can affect gene expression without altering gene sequence. Matt Silver discussed nutritional epigenetics in The Gambia. He found seasonal variation in paternal survival, which was 10 times lower in the rainy season compared to the dry season. He also reported increased methylation in rainy vs dry season pregnancies and methylation was associated with maternal 1-carbon nutrient biomarkers. Rebecca Richmond used Mendelian randomization to try and understand if there was a causal effect between maternal BMI and offspring BMI. She aimed to use large sample sizes and a genetic risk score using multiple SNPs other than just FTO, which has been used in previous studies. She reported that a greater variation of the maternal BMI on fetal BMI could be explained by those extra SNPs than by just FTO alone. She also noted that the variance in offspring growth may be a reflection of the maternal genome that can affect gene expression without altering gene sequence. Matt Silver discussed nutritional epigenetics in The Gambia. He found seasonal variation in paternal survival, which was 10 times lower in the rainy season compared to the dry season. He also reported increased methylation in rainy vs dry season pregnancies and methylation was associated with maternal 1-carbon nutrient biomarkers. Rebecca Richmond used Mendelian randomization to try and understand if there was a causal effect between maternal BMI and offspring BMI. She aimed to use large sample sizes and a genetic risk score using multiple SNPs other than just FTO, which has been used in previous studies. She reported that a greater variation of the maternal BMI on fetal BMI could be explained by those extra SNPs than by just FTO alone. She also noted that the variance in offspring growth may be a reflection of the maternal genome that can affect gene expression without altering gene sequence.

Maternal ante- and post-natal depression and its impact

This year maternal mental health had its own session, a sign of the importance, not only of targeting the individuals but the community, family and adolescents in promoting health education. It is also important to note that implementing lifestyle interventions requires more than just research team work, it also requires planning, forming partnerships with stakeholders and having infrastructure to produce positive outcomes as reported by the Malaysia Jom Mama Project.

DOHaD and fetal, neonatal and infant growth standards

This session presented new/refined standards for assessing fetal and neonatal growth, while identifying factors which may influence early growth and current gaps in this area.

INTERGROWTH-21st project:
Stephanie Kennedy, WHO University, UK and Fernando Barros, Federal University of Pelotas, Brazil
WHO growth standards are a globally utilised tool for assessing growth from birth to 5 years. However, they do not cover growth in utero which may have a significant impact on growth trajectories in the post-natal period. INTERGROWTH-21st study has recently filled this gap by providing prescriptive international standards for fetal growth and new born size for gestational age across 8 sites (USA, UK, Brazil, France, Oman, Italy, China and India). Fetal and newborn size were found to be comparable across populations when growth constraints were minimal and can therefore compliment the WHO standards to provide internationally relevant standards of growth through pregnancy to 5 years of age.

Additionally, a secondary aim of this study was to characterisation of the newborn (beyond low birth weight/preterm birth classification) provides more clinically relevant interventions for targeting outcomes. The influence of maternal HIV-infection perinatal outcomes

Stephen Kennedy, Oxford University, UK and Fernando Barros, Federal University of Pelotas, Brazil
ART naïve maternal HIV infection is associated with an increased risk of preterm birth, low birth weight, small-for-gestational age infants and still birth, with one preterm birth every 7 minutes in Sub-Saharan Africa in 2013 being due to HIV infection (200/day). Neonatal and infant body composition

Jorin Roelants, Erasmus Medical Center, Netherlands and Darren Dahly, University College, Cork, Ireland
Fat mass varies greatly between neonates born with similar birth weights and these differences in adiposity may be predictive of maternal nutritional status and ultimately adiposity in adults. Maternal nutritional status in pregnancy is linked to predicting neonatal fat mass exists and there is a lack of reliable, population based, longitudinal data on body composition through infancy.
Breastfeeding: Putting Science into Practice

Four breastfeeding research luminaries presented a fascinating global overview of breastfeeding patterns and trends (Cesar Victora), determinants (Linda Richter) and intervention evidence (Nigel Rollins). The session was moderated by Tim Armstrong, who provided an overview and a summary of the presentations. The session started off with a presentation by Dr Rihlat Said Mohammed who presented on the relationship between Folic Acid Supplementation during Pregnancy and Fetal Growth and Birth Outcomes. The impact of Folic Acid Supplementation on Fetal Growth and Birth Outcomes was investigated in a study set in 1993. The study showed that Folic Acid Supplementation had a positive impact among those who had higher weight gain during pregnancy. Supplementation had a differential positive impact on fetal biometry. The study also showed that the impact of Folic Acid Supplementation on fetal growth and birth outcomes was greater in those who had higher weight gain during pregnancy. Supplementation had a differential positive impact among those who had lower birth weight.

Gestational diabetes and its impact

John Newman et al. opened the session by outlining the principles of DOHaD and the cycle of life (see diagram below) in determining the long-term effects of gestational diabetes mellitus (GDM) in the offspring. In the Born Lynn study, they found that regular exercise didn’t prevent the recurrence of GDM but instead increased maternal fitness and psychological wellbeing. Several DOHaD speakers presented on their work and made the following conclusions:

- Vulnerable Windows Cohort Study, showed that greater maternal weight gain in early pregnancy and lower BMI are associated with lower beta cell function. However, faster postnatal growth is associated with lower insulin sensitivity.
- Monash University Study reported an unexpected and lower estimated fetal weight at 32-34 weeks and lower birth weight. Preliminary data show that the DOHaD hot topics break out session featured a range of talks tackling environmental factors that may impact fetal development and postnatal outcomes. Some of the topics addressed the negative impact of intrauterine exposure to infection, alcohol and cigarette smoke as well as the positive effects of nutritional supplementation on birth outcomes. The impact of maternal obesity and intrauterine growth restriction on fetal development and postnatal outcomes was also discussed.
- Various studies looked at the effect of maternal obesity on fetal growth and development and on metabolic programming in human populations in an indigenous Australian cohort (Kirsty Pringle et al.) and from the perspective of experimental mice studies (Alessa, M. A. et al.).
- Emily Dorey’s presented a paper that also examined the effect of maternal obesity on fetal growth and development and on metabolic programming in human populations in an indigenous Australian cohort (Kirsty Pringle et al.) and from the perspective of experimental mice studies (Alessa, M. A. et al.).
- Emphasis was placed on the Cape Town congress kick-off in earnest with the official opening of the congress being intuited by a truthseer followed by numerous distinguished guests facilitated by Lisa Micksfield. Among the guests to grace the stage was Mark Hanson, President of the DOHaD Society. Special thanks was extended to Shane Norris and the conference management team for making this congress a resounding success. Mark noted the steady increase of membership, particularly amongst underrepresented disciplines and the representation of no less than 58 countries globally. Of particular note was the plight of maternal and child health and nutrition. Emphasis was placed on the Cape Town Manifesto which is available for comment on the DOHaD Society website. Following Mark was The Armstrong from the WHO, who explained the role and mandate of the World Health Organisation. Noting that the global shift in the burden of disease has placed non-communicable diseases on the global agenda. The Honorable Lokman Hakim Sulaiman, Deputy Director-General for Public Health for the Department of Health in Malaysia, treated delegates to an insightful look at the influence of global markets on breastfeeding and the infant.”

DOHaD Opening Plenary

Monday the 9th of November saw the 9th Annual DOHaD Congress kick-off in earnest with the official opening of proceedings being intuited by a truthseer followed by numerous distinguished guests facilitated by Lisa Micksfield. Among the guests to grace the stage was Mark Hanson, President of the DOHaD Society. Special thanks was extended to Shane Norris and the conference management team for making this congress a resounding success. Mark noted the steady increase of membership, particularly amongst underrepresented disciplines and the representation of no less than 58 countries globally. Of particular note was the plight of maternal and child health and nutrition. Emphasis was placed on the Cape Town Manifesto which is available for comment on the DOHaD Society website. Following Mark was The Armstrong from the WHO, who explained the role and mandate of the World Health Organisation. Noting that the global shift in the burden of disease has placed non-communicable diseases on the global agenda. The Honorable Lokman Hakim Sulaiman, Deputy Director-General for Public Health for the Department of Health in Malaysia, treated delegates to an insightful look at the influence of global markets on breastfeeding and the infant.”

DOHaD Hot Topics

The DOHaD hot topics break out session featured a range of talks tackling environmental factors that may impact fetal development and postnatal outcomes. The session started off with a presentation by Dr Rihlat Said Mohammed who presented on the relationship between Folic Acid Supplementation during Pregnancy and Fetal Growth and Birth Outcomes. The study showed that Folic Acid Supplementation had a positive impact among those who had higher weight gain during pregnancy. Supplementation had a differential positive impact on fetal biometry. The study also showed that the impact of Folic Acid Supplementation on fetal growth and birth outcomes was greater in those who had higher weight gain during pregnancy. Supplementation had a differential positive impact on fetal biometry.

Neuro-developmental programming

The session on programming of infant neurological development and neuro-behaviour was chaired by Prof Linda Richter. All the speakers kept their talking points and presented cutting edge research that examined and outlined various methodological issues and theoretical models to address the complex issues of reliable estimation of early infant and childhood cognitive function and behaviour. Barak Morgan kicked off the session with a uniquely theoretically rich presentation of neurobehavioural programming by early social adversity. In this paper he discussed various learned behaviours in the child in relation to maternal care (sensitively) and he examined from an evolutionary perspective whether or not commonly perceived maladaptive behaviours were pathological or an adaptive advantage. The range of papers presented extended to Shane Norris and the conference management team for making this congress a resounding success. Mark noted the steady increase of membership, particularly amongst underrepresented disciplines and the representation of no less than 58 countries globally. Of particular note was the plight of maternal and child health and nutrition. Emphasis was placed on the Cape Town Manifesto which is available for comment on the DOHaD Society website. Following Mark was The Armstrong from the WHO, who explained the role and mandate of the World Health Organisation. Noting that the global shift in the burden of disease has placed non-communicable diseases on the global agenda. The Honorable Lokman Hakim Sulaiman, Deputy Director-General for Public Health for the Department of Health in Malaysia, treated delegates to an insightful look at the influence of global markets on breastfeeding and the infant.”

The session on programming of infant neurological development and neuro-behaviour was chaired by Prof Linda Richter. All the speakers kept their talking points and presented cutting edge research that examined and outlined various methodological issues and theoretical models to address the complex issues of reliable estimation of early infant and childhood cognitive function and behaviour. Barak Morgan kicked off the session with a uniquely theoretically rich presentation of neurobehavioural programming by early social adversity. In this paper he discussed various learned behaviours in the child in relation to maternal care (sensitively) and he examined from an evolutionary perspective whether or not commonly perceived maladaptive behaviours were pathological or an advantageous.