



Environmental | Epigenetics
Symposium
NEW FRONTIERS IN
AUTISM RESEARCH



Alycia Halladay, Autism Speaks
Jill Escher, Escher Fund for Autism

One Strong Voice

Environmental Epigenetics and disease



From discovery.org



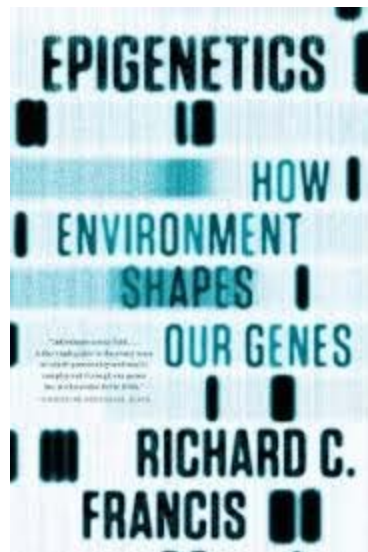
From time.com

Well established link b/w environment and epigenetics

KEYSTONE  SYMPOSIUM
on Molecular and Cellular Biology
Accelerating Life Science Discovery

CEHN
Research
Conference

San Francisco, CA
May 30–June 1, 2012

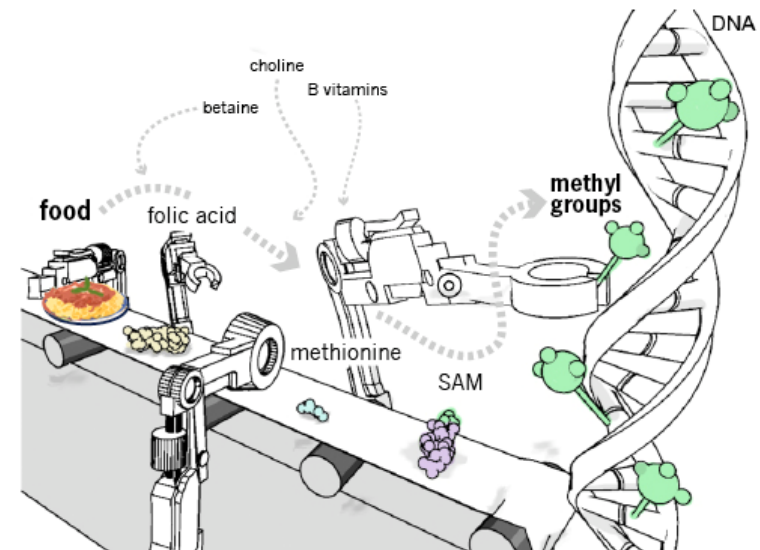


The Contribution of
Epigenetics
in Pediatric
Environmental
Health

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Epigenetics as the intersection of gxe

- DNA methylation as a mechanism
- Layering on environment in epidemiology studies
 - Assessing exposures and epigenetic expression
 - Generation F2 - multigenerational
 - Generations F3 and F4
- Animal models
- Cancer, Asthma, NDD



Utility of Twin Designs for ASD

OPEN

Molecular Psychiatry (2013), 1–9
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www.nature.com/mp

ORIGINAL ARTICLE

Methylomic analysis of monozygotic twins discordant for autism spectrum disorder and related behavioural traits

CCY Wong¹, EL Meaburn^{1,2}, A Ronald^{1,2}, TS Price^{1,3}, AR Jeffries¹, LC Schalkwyk¹, R Plomin¹ and J Mill^{1,4}



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Environmental Epigenetics and ASD – scientific conference

- Meeting March 22-23, 2013
- Autism Speaks, Escher Fund for Autism, MIND Institute
- Goals
- Planning/Steering Committee



www.autismepigenetics.org

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Scientific Conference

March 22-23, 2013

- Background and Mechanisms
- Role of the germline
- Neurodevelopment
- Exposures – examples from the field
- Ethical considerations
- Discussion topics



Emerging themes from presentation:

#1: More emphasis on genes **AND** environment, not on genes **VERSUS** environment

- multiple timepoints needed
- different tissues, if possible
- include diversity of exposures
- learn lessons from other disorders or diseases



Emerging themes from presentation

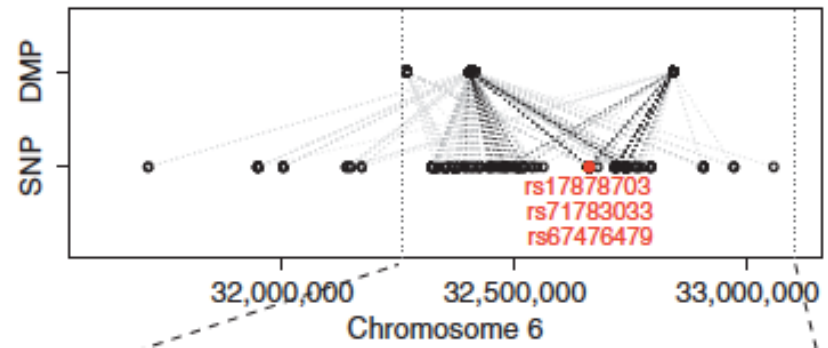
#2 Epigenetics as the moderator of gene/environment interactions

ARTICLES

nature
biotechnology

Epigenome-wide association data implicate DNA methylation as an intermediary of genetic risk in rheumatoid arthritis

Yun Liu^{1,2,12}, Martin J Aryee^{1,3,12}, Leonid Padyukov^{4,5,12}, M Daniele Fallin^{1,6,7,12}, Espen Hesselberg^{4,5}, Arni Runarsson^{1,2}, Lovisa Reinius⁸, Nathalie Acevedo⁹, Margaret Taub^{1,6}, Marcus Ronninger^{4,5}, Klementy Shchetynsky^{4,5}, Annika Scheynius⁹, Juha Kere⁸, Lars Alfredsson¹⁰, Lars Klareskog^{4,5}, Tomas J Ekström^{5,11} & Andrew P Feinberg^{1,2,6}



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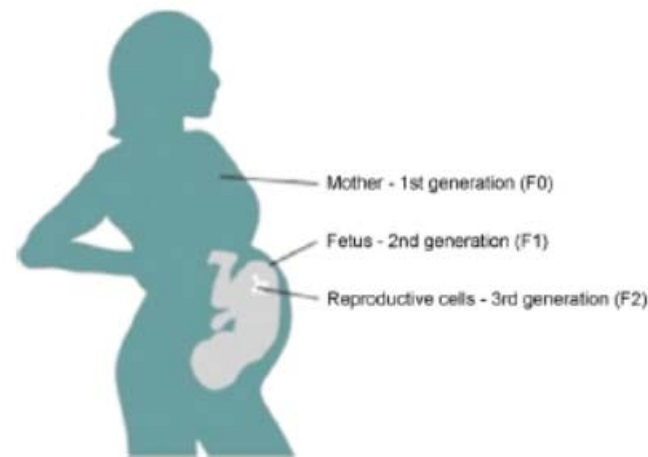
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Emerging themes from presentation:

#3: Lifecourse should include the germline

- Germ cells susceptible to environmental exposures
- Multigenerational studies finding effects
- Double hit – where is the cause?



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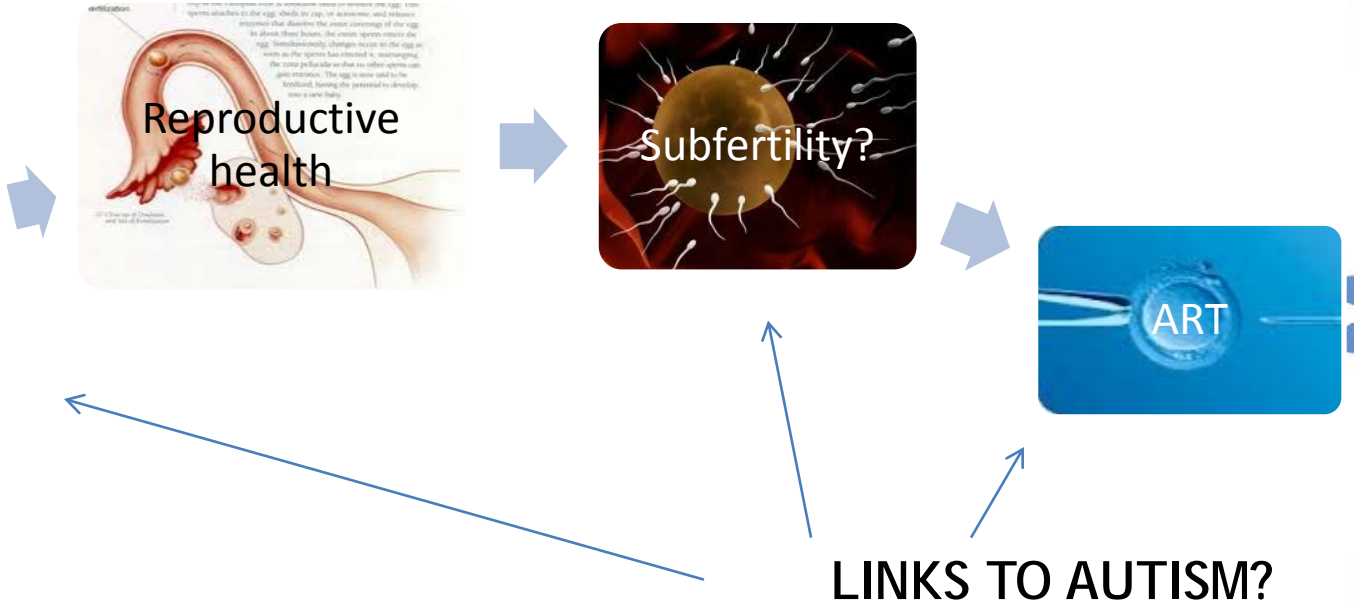
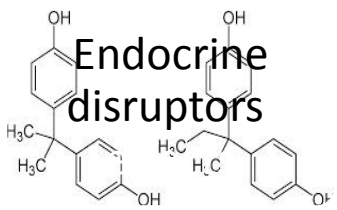
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Are we looking in the right place?



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Emerging themes from presentation:

#4: These issues cannot be solved by one area of research

- epidemiology
- animal model
- molecular approaches
- genetics
- toxicology



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- Andrea Gore, PhD, University of Texas at Austin
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- Tracey Woodruff, *PhD, UCSF*



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What does this mean for families with autism, or for future families?



Model of prevention, in addition to
intervention