The Autism Epidemic & The Pill

- Dr Ellen CG Grant

- www.harmfromhormones.co.uk

- Pub Med grant ec [AU]
Increases in incidence

- California 1987 - 1998
  - Autism Spectrum Disorder 300%
  - Cerebral palsy
  - Epilepsy 3%
  - Mental Retardation
“The Autism Epidemic”

Autism Spectrum Disorder (ASD)
Neurodevelopmental
Environmental toxins
Toxic metals
Oxidative stress
Maternal Pill (Progesterone) Use
Increase in ASD & toxic exposures

- DeSoto and Hitlan 2010 17 studies (4-5 each)

- Pockets of higher prevalence of ASD

- Increased rates of ASD associated with sources of contaminants

- ASD - Higher levels of neurotoxins

- ASD - Decreased detoxifying ability
Brain region-specific changes in oxidative stress markers 3-NT(3-nitrotyrosine) and neurotrophin-3

Areas associated

Speech processing
Coordination - sensory & motor
Behaviour - emotional & social
### Post-mortem 3-NT levels pmol/g

<table>
<thead>
<tr>
<th>Region</th>
<th>Controls</th>
<th>Autistic cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.6 to 12.0</td>
<td>1.7 to 281.2</td>
</tr>
<tr>
<td>orbitofrontal cortex</td>
<td></td>
<td>214.5</td>
</tr>
<tr>
<td>Wernicke's area</td>
<td></td>
<td>171.7</td>
</tr>
<tr>
<td>cerebellar vermis</td>
<td></td>
<td>81.2</td>
</tr>
<tr>
<td>cerebellar hemisphere</td>
<td></td>
<td>37.2</td>
</tr>
</tbody>
</table>
61 autistic children

Dr John McLaren-Howard

Deficiencies - Zn  Mg  Cr  Se  Mn  Cu  Mb  
B vits  EFAs

<table>
<thead>
<tr>
<th>Substance</th>
<th>WBC</th>
<th>DNA adducts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malondialdehyde (from lipid peroxidation)</td>
<td>16</td>
<td>26%</td>
</tr>
<tr>
<td>Cadmium</td>
<td>12</td>
<td>20%</td>
</tr>
<tr>
<td>Nickel</td>
<td>9</td>
<td>15%</td>
</tr>
<tr>
<td>Mercury</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>Lead</td>
<td>1</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
Fall in Children’s Zinc 1979 -1989

• 1979 150 Healthy Sweat Zinc 719 - 704 ug/l
• 1989 26 Controls 520 ↓
• 26 Dyslexia 358 ↓↓
• John McLaren-Howard

• 1971 10% of single women had used OCs
• 1981 95% used OCs before a First Pregnancy

Effect children 1980s 1990s & onwards
### Longer use of OCs before Pregnancies

**Breast cancer by age 36**

<table>
<thead>
<tr>
<th>Starting age</th>
<th>OCs for ≥ 4 years</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 18</td>
<td>Br Ca</td>
<td>80</td>
<td>71</td>
</tr>
<tr>
<td>19-21</td>
<td></td>
<td>71</td>
<td>61</td>
</tr>
<tr>
<td>22-24</td>
<td></td>
<td>57</td>
<td>48</td>
</tr>
<tr>
<td>25+</td>
<td></td>
<td>50</td>
<td>30</td>
</tr>
</tbody>
</table>
Figure: % increases 1962 - 1998 in annual Breast Cancer registration rates in England & Wales with more hormone use

- Age group 25 -34
Why ↑ Autism 1987 - 1998?

↑ Progesterone use  Genotoxic

• Cancers  Developmental disorders

• Current and Longer use

• Before a First Full Term Pregnancy

• In Pregnancy - fertility treatments

• miscarriage prevention  premature labour

• ↑ Breast  Cervix  Ovary  Lung  Cancers
The “PILL”

- **Progesterone** - like actions
- Cream jabs implants depots IUDs

- RCGP – world’s largest Pill study

- Mortality in young women $\uparrow$ 300%
Enzymes altered by Progesterone ↑

- **Oxygen metabolism**
- **MAO** Mono amine oxidase depression ↑
- **COMT** Catechol- O- methyltransferase pain ↓
- **Alkaline Phosphatase** osteoporosis ↓
- **SOD** Super oxide dismutase Zn Cu Mn ↓
- **GPx** Glutathione peroxidase Se ↓
  - oxidative and antioxidative capacity modulated by sexual steroid hormones
  - mediated through antioxidant metabolizing enzymes
<table>
<thead>
<tr>
<th></th>
<th>DNA adducts</th>
<th>WBC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Women</strong></td>
<td><strong>OCs/HRT</strong></td>
<td><strong>Never?</strong></td>
</tr>
<tr>
<td>Nickel</td>
<td>12.5%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Lindane-estrogen</td>
<td>8.7%</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Cancer Cases</strong></td>
<td><strong>Controls</strong></td>
<td></td>
</tr>
<tr>
<td>Malondialdehyde</td>
<td>18.5%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Nickel</td>
<td>18.5%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Genotoxic damage

• **Progestins** - acting like xs Progesterone
• Animals - **Chromosomal aberrations**  Sister chromatid exchanges
  Vitamin C prevents
• In vitro - **Free oxygen radicals**  Siddique 2005
• In women - **Mitochondrial dysfunction**  Ni/Lindane
  TL gene  ATP →ADP blocks $x^2 + P$  McLaren-Howard 2006
• **ASD**  Mitochondrial gene dysfunction
  mDNA  over-replication & deletions  Giulivi 2010
The AUTISM Epidemic & the Pill

- Genotoxic hormonal contraceptives
- Maternal ASD mitochondrial dysfunctions
- Maternal ASD DNA toxic adducts

Children always inherit maternal mDNA

- ASD susceptibility to damage \(\downarrow\) detox
- Replete deficiencies and remove toxins
- Non-hormonal contraception