Complexity and Limitations of Stress-Endocrine Research in Mental Health

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COMPLEXITY AND LIMITATIONS OF STRESS-ENDOCRINE RESEARCH IN MENTAL HEALTH

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Social Exclusion

People living on the streets suffer the highest rates of premature death
Q1: Concept of illness causation?

Q 2: Are these changes reversed by available therapeutic Interventions?

Q 3: Does the reversibility affect the outcome of therapeutic Interventions?
Exploring Bio-Psycho-social Model

- Biological
- Psychological
- Social

Endocrine Research
Psychoendocrine & Mental Health

• Mental health research is very much in need for a simpler understanding of the way biological responses arise in face of psychological and social challenges.

• Though it appears very simple to state that mind and body are integrated, on continuum and even dimensional, however the fact is that very little is known for this complex relationship.
Research achievements

- Epidemiological
- Clinical
- Behavioral
- Experimental

- HPA Axis
- Pituitary
- Thyroid
- CRH/CRF
- Neurotransmitters (DA, 5 HT)
- Transporters
- Neuromodulators
- Genetics, gene expression & gene material
Complexity in Research

- Response variability
- Accurate probe
- Applying animal research
- Quantification of response or measurements
- Synthesis of model

- Understanding the process of psychopathology
- Exploring environmental influence of brain mechanisms
- Newer targets for therapeutic interventions
Limitations

• Laboratory studies allow standardization of the stressor
• Commonly used stressors are mental arithmetic's, speech tasks, the Stroop test, videogame playing, films or videotapes and interviews.
• Generalizability of laboratory results, : Caution
• Another strategy is studying the psychoendocrine reaction to real-life stressors, such as bereavement or anticipated loss, academic examinations, everyday work and parachute jumping.
Limitations

• The subjective perception of the situation is probably a main determinant
• marked variability in individual responses
• Evidently, the 'objective' characteristics are not the only determinants
• it is mandatory to overcome a rigid dichotomy between psychological and biological processes.
Unexplained Link: Social Changes affecting Mental health

Early Childhood experiences
Lifestyle research
Trauma & Disaster
Specific stress
Cross-Cultural & Regional Differences

The probability of a man dying between the ages of 15 and 60 is 8.2% in Sweden, 48.5% in the Russian Federation, and 84.5% in Lesotho.

Differences in the quality of life within and between countries affect how long people live. A child born in Japan has a chance of living 43 years longer than a child born in Sierra Leone.
Occupational class difference in life expectancy, England, 1997-1999

Lack of control over work and home can have powerful effects on health.
Self-reported level of Job control and Incidence of coronary heart disease in men and women

Poor Control
- Inability to use their skills
- Low decision-making authority

( European Study)
"By itself, this gene is likely to contribute only a small amount of risk in interaction with other genetic and psychosocial influences; it won't make people violent," explained Meyer-Lindenberg. "But by studying its effects in a large sample of normal people, we were able to see how this gene variant biases the brain toward impulsive, aggressive behavior."

The gene is one of two common versions that code for the enzyme monoamine oxidase-A (MAO-A), which breaks down key mood-regulating chemical messengers, most notably serotonin. The previously identified violence-related, or L, version, contains a different number of repeating sequences in its genetic code than the other version (H), likely resulting in lower enzyme activity and hence higher levels of serotonin. These, in turn, influence how the brain gets wired during development. The variations may have more impact on males because they have only one copy of this X-chromosomal gene, while females have two copies, one of which will be of the H variant in most cases.
Can More Touching Lead to Less Violence in Our Society?

It probably can if Developmental Neuropsychologist James W. Prescott's Pleasure/Violence Reciprocity Theory is correct.
• It is more clearly understood now the genetic mechanism play important role in providing the fertile or infertile background for behavioral characteristics which causes and modulates individual ‘vulnerarism’
Developmental determinants of sensitivity & resilience to Stress,
Psychoendocrinology, (2005) 30

Genome → Phenotypic Plasticity → Environment

Allele variation → Gene expression → Developmental Trajectory

Perinatal stress → Sensitive period

Social support → Trauma → .....Social experience

Resilience → Vulnerability

Puberty
Development of PFC

- Adrenals
- Thyroid
- CRH
- Estrogen
- Prolactin

Modulators → Transporters → Transmitters → Physiological processes CAMP → Receptors → Gene product

Early experiences

Developmental process

Molecular Biology as a tool allows systemic screening of significant genes for search of molecular variants
Social Relationship & Management of Stress

• Stress response can be ameliorated by the presence of members of same species, called social support,
• Bonding partner reduces the activity HPA
• N.Sachser et al, 1998

Dopamine, aggression and ACE

Psychoendocrinological evaluation of interventions & outcome....Limited evidence
Therapeutic advantage?

- Long before it was observed that social changes can induce brain volume changes, there is some more light from current research in the field of imaging.
- However, will the stress-endocrine response be able to reach a point of providing specific therapeutic probes remain only a matter of speculations, so far. We hope that the complexity and limitations will be minimized in the future.
Summary

- Complex research
- Hope from molecular genetics
- Synthesis of a model of stress influence is a challenge