

# Genetics of psychiatric disorders

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# Schizophrenia

- ◆ Is a chronic relapsing psychotic disorder which affects young population and interfere with:
  - Thoughts
  - Perception
  - Volition
  - Behavior


# Schizophrenia

- ◆ Family studies, show that the more closely related an individual to a schizophrenic patient the higher the risk to develop it .
- ◆ Kendler in 1985, compared rates of illness in 723 1st degree relatives of probands and 106 similar relatives of matched surgical control, the risk was 18 times greater in the relatives of probands.
- ◆ The increased risk was for schizophrenic spectrum disorder .
- ◆ Familial aggregation of an illness does not necessarily confirm genetic transmission, intra-familial environmental may play a role.

# Twin and adoption studies

- ◆ The risk for GP. Is about 1% In both sexes, in 2<sup>nd</sup> degree relatives 3% ,in non-twin siblings 8%,in DT twins 12% , in mz twins 47% , and for a child with one parent affected parent 12% and if both affected 40% .
- ◆ The risk for twins is the same when reared together or apart, this emphasizes the role of genetic factors over environmental factors .
- ◆ Heston 1968 followed 47 adopted away children of schiz. mothers 5 became schizophrenic around the age of 36 compared to none in the control group .
- ◆ Adoption studies control for post-natal effects, they can't do so for pre-natal, organic causes . (intrauterine environment may differ in schizophrenic. and normal mothers ).

# Mode of transmission

- ◆ Not known, suggested modes: polygenic/ multi-factorial, single gene with low penetrance (study of children of mz twins discordant for schizophrenia )
  - ◆ Schizophrenia does not follow simple Mendelian pattern of transmission, probably because it is etiologically heterogeneous, Multi-factorial.
  - ◆ What inherited is the vulnerability to develop the disorder .
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# Personality and anxiety disorders

- Difficult to define .
- Broad definition (personality refers to those relatively stable? and enduring? aspects of the individual which distinguish from other people and form the basis of our predictions concerning his future behaviors ) .

# Diagnostic Criteria For Anxiety

- ▶ Excessive anxiety and worry, for more days than not for  $\geq 6$  months, about many subjects
- ▶ Worry is difficult to control
- ▶ Anxiety, worry, physical symptoms impair social, occupational, and other functioning



# Diagnostic Criteria (cont'd)

- ◆ Associated with  $\geq 3$  of the following
  - restlessness/keyed-up
  - easily fatigued
  - difficulty concentrating
  - irritability
  - muscle tension
  - sleep disturbances
- ◆ Cannot be confined to another Axis 1 diagnosis or the effects of a substance or medical condition



# Anxiety disorders include

- ◆ Generalized anxiety ( GAD )
- ◆ Panic
- ◆ Obsessive compulsive disorders OCD
- ◆ Phobias
  - social phobia
  - Agoraphobia
- ◆ Acute stress reaction
- ◆ Post traumatic stress reaction

# Personality and anxiety disorders

- ◆ Genetic studies of personality , confirms that personality traits are inherited .
- ◆ Correlation of personality traits among mz twins is much higher than that of dz twins .
- ◆ Shared family environment appears to have little influence on personality, the environment as a whole contributes to 50% or more of the personality variation .
- ◆ Mz twins show higher concordance rate than dz twins for anxiety disorders (41% v. 4% ) .

# Eating Disorders

- ◆ Anorexia Nervosa, affects young women of high social class involves self induced weight loss, BW 15% less than expected , self induced vomiting body image distortion and amenorrhea .
- ◆ Bulimia nervosa, Bing eating with loss of control, vomiting and purgative abuse


# Eating disorders

- ◆ Gershon 1984 found that life time risk of eating disorders in 1<sup>st</sup> degree relatives of probands to be 6% compared to 1% in relatives of the control .
- ◆ Concordance rate of anorexia nervosa is significantly higher in mz twins than dz twins. No such effect was found for bulimia .

# Alcoholism

- ◆ Alcoholism provides an example of a complex genetically influenced disorder .
- ◆ Family studies confirm an average of 7-fold increased risk to 1<sup>st</sup> degree relatives of alcoholics compared with controls , this is consistently higher in males .
- ◆ Several studies showed higher rates of concordance in MZ than DZ twins .
- ◆ Adoption studies provides the strongest evidence for genetic contribution ,the risk for offspring raised away from their alcoholic parents is 2-fold for both sexes .
- ◆ The explanation may lie in the fact that ,different people have different allelic variant of alcohol metabolizing enzymes (ADH, ALDH )

# Bipolar mood disorders

- ◆ A chronic relapsing psychotic disorder affects mood in different phases (high/ low).
  - ◆ Thought
  - ◆ Perception
  - ◆ Behavior
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# Bipolar mood disorders


- ◆ The morbid risk of BMD to 1<sup>st</sup> degree relatives of probands is about 8% and of UP illness is over 11% (GP. 1% , 3% ) .
- ◆ Twin studies agree that MZ concordance rate are about 4 times greater than DZ .
- ◆ Studies showed excess of UP disorder and suicide in the biological relatives of ill adoptees , compared with adoptive relatives and relatives of control group of normal adoptees .



# Alzheimer's dementia

- ◆ A chronic, irreversible, progressive cognitive disorder affects( memory, learning, judgment, reality testing) in clear consciousness, affects elderly people.

# Alzheimer's disease


- ◆ The cause is not known , however the results of family and twin studies indicate the importance of genetic factors .
  - ◆ Pedigree studies reports that familial pattern goes with autosomal dominant inheritance .
  - ◆ Heston 1981 estimated that the cumulative incidence of AD in members of early onset families approaches 50%by 90 yrs.
  - ◆ Such clear evidence is less easy to find in late onset families .
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# Huntington's disease

- ◆ A chronic progressive neurodegenerative genetic disorder that affect muscle coordination (chorea), shows cognitive decline and psychiatric disorders

# Huntington's disease

- ◆ Inherited as an autosomal dominant trait
- ◆ Penetrance in HD is complete, but the age of onset is delayed until between the 3<sup>rd</sup> and 5<sup>th</sup> decade of life.
- ◆ It's difficult to fulfill Pre-symptomatic testing conditions (DNA from both parents and a grandparent / from 2 close relatives of the affected parent, who are either definitely affected or past the age at risk .

- ◆ In conclusion genetic factors play an important role in the etiology of psychiatric disorders .
  - ◆ This proved through
    - Family pedigree studies
    - Adoption studies
    - Twin studies
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THANK YOU

