Brain functions affected during menopause

- Autonomic
  - Gonadotrophins
  - Sleep
  - Vasomotor episodes (hot flushes)
  - Libido
  - Mood
  - Metabolic regulation
- Cognition
- Sensory perception
- Memory
- Voluntary motor function
- Immunologic function
- Sexual function & dysfunction (presumed to be sex steroid related)
Effects of sex steroids in the brain (1)

Estrogen

- Estrogen affects all brain cells by direct and indirect cellular effects
- affects neurons and glia
- regulates brain blood vessels
- has been shown to influence most brain functions, regulating biochemical and anatomic parameters
- can affect the concentrations of neurotransmitters
Effects of sex steroids in the brain (2)

Progestin

- Has potent anesthetic properties
- predisposes to dysphoric moods
Estrogen, progestin and androgen modulate synthesis, release and metabolism of neurotransmitters such as:

- Noradrenalin
- Dopamin
- Serotonin
- Acethyl choline
- β-endorphin
- Neuropeptide Y
- Corticotrophin releasing factor
- Gamma-aminobutyric acid
- Gonadotrophin releasing hormone
- Thyrotrophin releasing hormone
- Calcitonin gene-related peptide
Sex steroids may also affect neuronal differentiation and survival through several different local regulatory mechanisms:

- regulation of proteins involved in neuronal survival
- antioxidant effects
- effects on neuronal energy mechanism
- induction of growth factor mediated responses
Anxiety Disorders

• Panic and anxiety disorders (panic disorder and generalised anxiety disorder)
• Phobic disorders (agoraphobia, social phobia, specific phobia)
• Obsessive-compulsive disorder
• Posttraumatic stress disorder
### Lifetime prevalence of subgroups of anxiety disorders

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Total</th>
<th>Lifetime Prevalence Rate</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Phobias</td>
<td>12.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific phobias</td>
<td>11.3%</td>
<td>14.5%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>5.6%</td>
<td>7.9%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Social phobia</td>
<td>2.7%</td>
<td>2.9%</td>
<td>2.5%</td>
</tr>
<tr>
<td>OCD</td>
<td>2.5%</td>
<td>1.5%*</td>
<td>1.1%*</td>
</tr>
<tr>
<td>GAD</td>
<td>2.5%</td>
<td>3.8%</td>
<td>1.1%*</td>
</tr>
<tr>
<td>PTSD</td>
<td>1-9.2%</td>
<td>1.3-11.3%</td>
<td>0.5-6%</td>
</tr>
</tbody>
</table>

*1-month prevalence
Biological theories about the etiology of anxiety disorders (1)

Generalised Anxiety Disorder (GAD)

- Catecholamine theory
- Locus coeruleus theory
- Lactate panicogenic metabolic theory
- Carbon dioxide hypersensitivity theory
- GABA-benzodiazepine theory
Biological theories about the etiology of anxiety disorders (2)

Panic Disorder

• A surge of plasma epinephrine was found in 50% of cases
• Phenylethylamine or similar endogenous amines may be involved in mood response to social approval or disapproval
• Genetic component
Biological theories about the etiology of anxiety disorders (3)

**Obsessive-Compulsive Disorder (OCD)**

- Genetic link between OCD and depression and Tourette’s syndrome
- Neurologic models: orbitofrontal-limbic-basal ganglia abnormalities
- Biochemical models:
  - Serotonin dysregulation
  - Dopaminergic dysregulation
Biological theories about the etiology of anxiety disorders (4)

Post-traumatic Stress Disorder (PTSD)

- Hyperarousal
- Kindling model
- Numbing model
- Serotonergic dysfunction
Results

- No directly related articles
- Epidemiological Studies have too wide age intervals, which makes them impossible to interpret according our topic
Conclusion

- No sufficient data available to show any relation between anxiety disorders and menopause
- More attention should be paid to the courses and eventual neuropsychic basis of the anxiety disorders.
- Availability of the articles and language limitations have a remarkable negative effect on the quality of a bibliographic review.
Thank you very much for your kind attention.