• Lecture: “Testosterone, Erectile Dysfunction and Depression in Adult Men”
• Event: HOPE Scientific Seminar & Luncheon
  Palm Beach - February 20th, 2009
• Speaker: Steven Roose, M.D.
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  College of Physicians & Surgeons,
  Columbia University
  Director of the Neuropsychiatry Research Clinic,
  New York State Psychiatric Institute

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Testosterone, Erectile Dysfunction and Depression in Adult Men

Steven Roose, MD
Columbia University

Symptoms of Depression

- Depressed mood, sad or empty, most of the day, nearly every day
- Anhedonia - lack of interest or pleasure
- Sleep - insomnia/hypersomnia
- Appetite or weight change
- Fatigue, loss of energy
- Agitation/retardation
- Diminished ability to think or concentrate
- Low self-esteem or inappropriate guilt
- Recurrent thoughts of death or suicidal ideation

Faces of Depression
Faces of Depression

Symptoms
- Irritable
- School phobia

Male Testosterone Levels

Psychiatric Sequelae of Hypogonadism
- Reduced libido
- Erectile dysfunction (loss of nocturnal and spontaneous erections)
- Fatigue
- Irritability
- Dysphoria
- Confusion

- Testosterone replacement reverses most hypogonadal symptoms
Hormonal Deficiency of Age

- Females: menopause
- Males: andropause, or androgen deficiency of the aging male (ADAM)
  - Progressive age-related reduction in androgen level
  - Clinical implications?
    - Metabolic changes
    - Psychiatric symptoms

ADAM
Androgen Deficiency of the Aging Male

Metabolic signs
- Decreased lean body mass, muscle volume, and strength
- Decreased bone mineral density
- Visceral adiposity
- Reduced body hair and skin alterations
- Impaired hematopoiesis

ADAM
Psychiatric symptoms
- Reduced sexual desire and erectile quality, especially nocturnal erections
- Weakness/fatigue
- Dysphoria/anxiety/irritability
- Memory impairment and decreased spatial orientation
Testosterone and Depression in Middle-aged and Elderly Men

- What is the relationship between testosterone level and depression?
- What are the psychiatric effects of exogenous testosterone replacement in men with hypogonadism and/or depression?

Testosterone Administration to Hypogonadal Men

- Wang C, et al., 1996
- 51 hypogonadal men
- Age range: 22-60 years
- 6-month testosterone replacement study
- T replacement compared to baseline:
  - Positive mood scales: increase in friendliness, energy level, well-being
  - Negative mood scales: decrease in nervousness, irritability, sadness, anger

Psychiatric Effects of Testosterone Administration

- Eugonadal men
- Physiologic doses
  - Mild increase in sexual arousal and mood
- Supra-physiologic doses
  - Idiosyncratic mood changes
    (anger, irritability, euphoria)
  - Hypomania (10%-20%)
Testosterone Replacement in Men With MDD: Conclusion

In clinical trials with depressed, hypogonadal men, antidepressant response to T replacement could not be differentiated from placebo.

Testosterone Effects in Adult Men
- Systemic
  - Maintenance of secondary sexual characteristics
  - Metabolic actions (anabolic)
- CNS
  - Sexual arousal
  - Emotional activation
  - Cognitive effects
  - Male dominance/submission

Erectile Dysfunction and Depression

Does treatment of ED also treat the Depression?
Study Population

<table>
<thead>
<tr>
<th></th>
<th>Placebo</th>
<th>Sildenafil</th>
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<tbody>
<tr>
<td>Number of subjects</td>
<td>78</td>
<td>74</td>
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<tr>
<td>Mean age</td>
<td>55</td>
<td>56</td>
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<tr>
<td>Age range</td>
<td>25-81</td>
<td>27-76</td>
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<tr>
<td>Mean baseline HDRS-24</td>
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Depression Study Protocol R-0538: Sildenafil in Men with Depression

<table>
<thead>
<tr>
<th></th>
<th>ED Nonresponder</th>
<th>ED Responder</th>
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<tbody>
<tr>
<td>Placebo</td>
<td>77%</td>
<td>23%</td>
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<tr>
<td>Sildenafil</td>
<td>17%</td>
<td>83%</td>
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</table>

Depression Scores by Response to Treatment at Week 12: ITT

*P < .001.
Responders and nonresponders values are least squares means.