



**Endocrine & Metabolic
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Public Forum

Hormones & Overweight/Obesity Management

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Hormone Imbalance and Fat

- Pituitary Failure (Hypopituitarism)
- Thyroid Failure (Hypothyroidism)
- Steroid Excess (Cushing's syndrome)
- Polycystic Ovary Syndrome
- Insulin Excess
- Leptin Deficiency

Energy Balance and Body Fat Storage

- Body weight is a result of the balance between energy intake and energy output
- When calorie intake (from food) exceeds calorie output (by exercise & metabolic rate), we will store the energy excess as body fat and gain weight
- Excessive weight gain leads to overweight & obesity

Fat as an Endocrine Organ

- Fat tissues secrete a whole host of protein hormones such as
 - PAI-1 (plasminogen activator inhibitor-1)
 - TNF α (tumor necrosis factor alpha)
 - IL-6 (interleukin-6)
 - Resistin
 - Angiotensinogen
- These hormones can lead to hypertension, diabetes, heart attack & stroke

Gut Hormones and Appetite Control

- Because appetite is an important determinant of how much we eat, it is integral as a factor of obesity
- Appetite interestingly is also regulated by a range of hormones
 - Ghrelin – increases our appetite (hunger hormone)
 - Leptin, protein YY, cholecystokinin, glucagon-like peptide-1 (these are satiety hormones)

Possible Mechanisms of Bariatric (Weight Reducing) Surgery

- It is possible that weight reducing surgery (also called 'bariatric surgery') works via
 - Altering the appetite regulating hormones (eg. increasing GLP-I and PYY)
 - Altering gut bacteria (microbiome) which exerts an impact on weight regulation through complex mechanisms and pathways

What's WAT and BAT?

- WAT – white adipose tissue (or simply white fat)
 - When excessive, leads to obesity & metabolic diseases like diabetes
- BAT – brown adipose tissue (or simply brown fat)
 - When stimulated and/or increased, leads to increased metabolic rate & weight maintenance or weight loss by burning up fat in the body

Browning from WAT to Beige/Brite

- It is possible to convert WAT to a form of BAT called beige or brite fat which burns up fat in the body
- Methods to effectively harness browning are presently an active topic of metabolic research
 - Cold stimulation
 - Nutraceutical or functional foods based on naturally occurring food substances like peppers and spices (eg. capsaicin, capsinoids, menthol, mustard, ginger etc)

Summary

- Overweight & Obesity can be related to hormonal imbalance
- Body weight is regulated by a host of hormones working harmoniously together
- Hormones control both appetite (energy (E) intake) & metabolic rate (energy (E) output)
- Fat itself is a hormonally active organ
- 2 main types of fat – white (stores E) vs brown (releases E)
- White fat can be changed into beige fat (a type of brown fat) under the correct hormonal & environmental stimuli