**Hormone and Metabolic Modulators**

**What are they?**

Anti-estrogens are used in the treatment of women with breast cancer and other hormone-dependent tumors as well as osteoporosis, and in order to stimulate ovulation. No medical use exists for the treatment of men. Hormone antagonists and modulators, sometimes known as anti-oestrogenic substances act to either decrease the amount of oestrogen in the body or block the oestrogen receptors.

**Status on the prohibited list**

These come under S4 on the list of substances and methods prohibited at all times (In and Out of Competition).

**Examples (5 different classes)**

- Aromatase inhibitors
- Selective estrogen receptor modulators (SERMS)
- Other anti-estrogenic substances, such as clomiphene
- Agents modifying myostatin function(s)
- Metabolic modulators.

**Who would use them, and why?**

The anti-oestrogenic drugs Tamoxifen and Clomiphene are used by both male and female athletes. Males use Tamoxifen in conjunction with anabolic steroids in an attempt to prevent gynecomasia (the development of oversized mammary glands in males). It is also used to increase testosterone levels. Female body-builders and weight lifters have been known to use Tamoxifen as blocking the oestrogen receptors leave testosterone unopposed, leading to an increase in masculine features. These substances may be illegally used by athletes to counteract undesirable side effects associated with anabolic steroid use such as gynecomastia.

**Side effects of Hormone Antagonists and Modulators:**

- Hot flushes
- Gastrointestinal disorders
- Fluid retention
- Venous thrombosis