A177 Detection of Anabolic Steroids in Dietary Supplements

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After attending this presentation, attendees will become aware of the various steroids that have been detected as active ingredients in over-the- counter nutritional supplements. In recent years, the use of performance enhancing dietary supplements has become popular. A particularly dangerous class of synthetic steroids has been created for athletes and has no approved medical use.

This presentation will impact the forensic science community by discussing analytical profiles of some of the most recently encountered steroids in dietary supplements.

In recent years, a number of designer anabolic steroids have surfaced as active ingredients in dietary supplement products. Designer anabolic steroids are synthetic modifications of testosterone, sharing the same four-ring core structure of the molecule. Today, many athletes have turned to these products to improve their performance and increase their muscle mass. As such, these supplements are marketed as muscle building, performance enhancing, and weight loss over-the-counter (OTC) products.

Recent investigations of OTC dietary supplements have indicated that often, the information on the label is misleading, incomplete, or simply absent. Chemical analysis has revealed that many of these supplements are contaminated or spiked with low concentrations of anabolic steroids and contain undeclared prohormones. A prohormone, such as 4-androstene-3,17-dione can be converted in the body into testosterone, a natural male hormone. The use of these substances has been prohibited by the World Anti-Doping Authority (WADA) in order to achieve fair play and to prevent cheating in athletic competitions.

Most of the designer steroids have surfaced either as esters, ethers, chlorine, bromine, or nitrogen derivatives. Newer submissions of dietary supplements have indicated the presence of other steroids and prohormones that have not yet been classified as controlled in the U.S. Controlled Substances Act (CSA). Once ingested, they can produce similar anabolic effects on the body with a chance of not being detected in routine doping tests. These supplements have been found to contain complex matrices that make their analysis challenging, time consuming, and expensive.

This presentation will discuss the analytical profiles of some of the most recently encountered steroids in dietary supplements. Prohoromone and hormone derivatives of testosterone such as nandrolone, drostanolone, dihydrotestosterone, methyl-1-testosterone, and 4- androstene-3,17-dione will be discussed. Other designer steroids such as prostanozol, dimethazine, madol, methoxygonadiene, 4,9(10)-estradiene- 3,17-dione, and 1,4-androstadiene-3,17-dione will also be covered. The steroids were characterized by gas chromatography mass spectrometry (GC/MS), electrospray ionization (ESI) liquid chromatography mass spectrometry (LC/MS), and LCMS/MS. Steroid detection by high resolution accurate mass spectrometry will also be covered along with some of the limitations and challenges of this type of analyses will. **Dietary Supplements, Anabolic Steroids, Mass Spectrometry**

 ** Presenting Author*