

HED Matters

Theme: Enhancement Drugs and Women

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Editorial

Welcome!

Arnold Schwarzenegger has a bodybuilding tournament named after him, but Florence Griffith Joyner's three Olympic gold medals have had a permanent cloud of suspicion surrounding them since she won them at the 1988 Games. Yes, these two cases have important differences. Arnie never competed at an Olympic Games, or in events where doping controls were necessary (or even wanted), and his use of steroids is not a secret – he has admitted his use, and harbors no regrets. His steroid use certainly did not stop him from becoming one of the most famous action movie stars in the world, or the 38th Governor of California.

In comparison, 'Flo-Jo', an American track and field athlete who competed at two Olympic Games and would have been subjected to numerous doping tests, denied ever doping. The world records she set in the 100m and 200m events still stand, more than 30 years later, yet for most people their recollections of her will be the controversy that still surrounds those three gold medals, and the dramatically improved times she ran in 1988 compared to her previous best in 1987. Despite their differences, these two cases are illustrative of how gender can influence how we view human enhancement drug use.

This issue of HED Matters focuses specifically on women. The decision was taken because we acknowledge that much of the research into human enhancement drugs focuses on men. There are legitimate reasons for why this is so. Men benefit much more from exogenous steroid use than women with regards to increases in muscle strength and size, for example, and the sports in which steroid use is more prevalent (e.g. bodybuilding) have, for some time, been dominated by men.

However, society is increasingly acknowledging that the focus on men has meant that there has been little-to-no focus on women, and there are enormous gaps in our knowledge on women and drugs that has important implications for diagnosis, treatment, and prevention. This gap is so wide that major funding bodies and academic journals are now requiring gender analyses be conducted so that, for instance, we can better understand how new therapeutic drugs may work (or conversely, cause harm).

In this issue, the ECR spotlight is on Victoria Felkar, a PhD student at the University of British Columbia, who particularly highlights her work around understanding the use of synthetic estrogen and progestin within the female athlete. Next is a research piece by Dr Séverine Lamon who discusses the role of testosterone in female muscle adaptation to exercise; showing that this relationship between testosterone and muscle performance is not so simple. This is followed by a piece from Prof Francis Quirk who explores the treatments available to improve or enhance women's sexual interest and responsiveness; a generally overlooked population in this space.



Dr Charlotte McLean and Dr Jennifer Germain then discuss the gender gap amongst people who use image and performance enhancing drugs (IPEDs); with women using IPEDs often being judged more harshly than their male counterparts, especially when their drug use challenges gender normativity. Next comes a researcher spotlight on Dr. Azenildo Santos who highlights the need for collaboration regarding new patterns of appearance among women (demonstrating examples from Brazil) and the potential substances that are used to achieve this. Finally, we have a practitioner's piece by Kay Stanton, a peer worker from Your Community Health where she is leading a steroid education program for over 23 years. She answers questions about the issues that women face when it comes to the use of enhancement drugs.

Finally, we would like to say farewell to Dr April Henning who after being part of the HEDN board for over five years has unfortunately decided to step down to focus her energy on other exciting projects in the enhancement drugs and sport space. She was a valuable member of the team and we would like to thank her for all her hard work! While April will be greatly missed, we are excited to announce that Assoc Prof Alexandra Hall will be joining the board in her place. Alex is Associate Professor of Criminology at Northumbria University, UK. She conducts research on illicit markets (counterfeit goods, pharmaceutical, psychoactive, and performance and image enhancing drugs), cybercrime and criminal financing. She has also co-published the Palgrave Macmillan book "Fake Meds Online: The Internet and the Transnational Market in Illicit Pharmaceuticals" in 2016.

Yours sincerely
The HEDN Board



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Announcement: Upcoming HEDN webinar!



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**HEDN Webinar -
Enhancement Drugs &
Women**

by The Human Enhancement Drugs
Network (HEDN)

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We are proud to announce that the Human Enhancement Drugs Network (HEDN) is hosting its first webinar on enhancement drugs and women on February 25, 2021. The webinar is part of a series of webinars on human enhancement drugs that will be organised in connection with the publication of HED Matters.

Starts at

7.30 pm AUS time (UCT+11), 8.30 am UK time (UCT), 9.30 am Central European time (UCT+1)

Moderator

Dr Matthew Dunn, Senior Lecturer at Deakin University and HEDN Board Member

Program

- 7.30-7.40pm: Welcome
- 7.40-7.50pm: **Ingrid Amalia Havnes**, MD, PhD, Oslo University Hospital, Norway
- 7.50-8.00pm: **Séverine Lamon**, PhD, Deakin University
- 8.00-8.10pm: **Alexandra Aldridge**, PhD Candidate, University of London
- 8.10-8.20pm: **Kathryn Henne**, PhD, Australian National University
- 8.20-8.50pm: Discussion
- 8.50-9.00pm: Future steps

The webinar is free - but spots are limited!

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Table of Contents

ECR Spotlight: "Steroids are (not only) for men!" <i>by Victoria Felkar</i>	6
Breaking through the assumptions: The role of testosterone in female muscle adaptation to exercise <i>by Séverine Lamon</i>	11
Treatment and enhancement options for females with sexual interest and arousal issues <i>by Frances Quirk</i>	16
Some drug use is more deviant than others: Discussing the gender gap amongst IPED users <i>by Charlotte McLean & Jennifer Germain</i>	21
Early years as an athlete and later research interest in performance and appearance enhancing substances <i>by Azenildo Santos</i>	26
Q&A with Kay Stanton, peer worker at Your Community Health in Melbourne, Australia <i>by the HEDN board</i>	31
Upcoming Events and Conferences	34
Achievements by HEDN Members	35

ECR Spotlight: "Steroids are (not only) for men!"

By Victoria Felkar, doctoral student, School of Kinesiology, University of British Columbia, Canada

How I got started? Curiosity and confusion!

My interest in the study of women and anabolic-androgenic steroids (henceforth steroids) began early in my undergraduate degree in Kinesiology. At the time I was an active member of the bodybuilding community with future aspirations to compete, working in the fitness industry, and navigating the healthcare system as a young female athlete with suspected reproductive and endocrine issues.

Growing up in Canada during the 1990s and early 2000s, the narrative I learned about steroids was simple. They were dangerous drugs used by men to 'get big' or 'win' contests. In the media, users were described as 'juice heads', 'unnatural', and even 'criminals.' Furthermore, women should never use steroids – they are unsafe and must be avoided due 'masculinizing' effects.

While employed and training at a popular bodybuilding gym in my first year of university, this depiction of steroids began to fracture. Within this environment, I was surrounded by local competitors and strength training aficionados who spoke candidly about all aspects of their fitness regime – including enhancing drug use. None of the individuals I encountered fit the popular stereotypes of a 'steroid user.'

As a young hyper-muscular female, I was often accused of using steroids. At 18 years old, I struggled with these allegations. Inside the gym, it was almost a compliment to be called a steroid user because it meant I had respectable strength and muscularity. At the same time, the snickers and commentary I received in public felt shameful, accusatory, and left me questioning my appearance, passion for weight-training. While I had never used steroids, to be prejudicially associated with steroid use was frustrating, confusing, but also rewarding. I wanted to understand more. Why were muscularity and strength in women associated with steroid use? What did a female steroid user even look like?



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During this time, it was discovered several reproductive and endocrine-related derailments had caused my endogenous androgen levels to spike to “unnaturally” high levels. Although I had learned in exercise physiology class androgens were vital and advantageous to athletic performance, in my own body elevated levels were diagnosed as ‘diseased’ and I was prescribed a myriad of drugs as treatment – including the oral contraceptive pill. If they were naturally occurring, I did not understand why androgens were considered ‘unhealthy’ in my body? Why was I being put on ‘birth control’ to reduce them? What impact would it have on my athletic performance? Were there other female athletes like me?

These experiences were just the ‘tip of the iceberg’. Throughout my undergraduate, master’s degree, countless experiences and opportunities gifted me with a tremendous breadth of perspective and curiosity about this topic. I developed a deep appreciation for interdisciplinary and translational research, and its essential role in creating practical and substantive contributions to our understanding of enhancing drug use, women’s health and athletic performance, and discussions of sex, drugs, and reproduction in sport more broadly.



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Current and next steps: Understanding the use of synthetic estrogen and progestin within the female athlete

Over the last 15 years, my relationship to the bodybuilding subculture, work in the fitness industry, and academic pursuits have evolved and varied significantly. I remain committed to the study of women and pharmaceutical steroids use within professional work and doctoral research at the University of British Columbia. Outside of academia, I work as a consultant and educator specializing in female (athlete) health, integrated health-performance practices, and risk management.

Currently in write up, my dissertation explores the lacuna of women and steroid use in sport and physical culture, focusing on the use of pharmaceuticals steroids – primarily, the administration estrogen and progestin, for the intentional manipulation of women’s reproductive function.

Despite the enormous influence of synthetic steroid hormones on science, medicine, and sport over the past 100 years, knowledge about women and the use of these compounds in sport remains fragmented and largely underdeveloped. Across multiple domains, including scientific study, clinical application, public policy, the little research that does exist on synthetic androgens specifically, tends to embody and promote rigid cultural ideas about sex/gender, and reproduces problematic attitudes towards both enhancing drug use and the female body. Moreover, there is little recognition of the longstanding and popular use of synthetic estrogen and synthetic progesterone (progestin) female athletes.

Studies estimate that nearly half the sporting female population use some of form synthetic estrogen and/or a progestin, often as a way to gain overall systematic control over reproductive function. This practice, however, is not new. Since the 1930s, various forms of synthetic estrogen and progestin have been used individually or together to pharmaceutically manipulate and control the reproductive function and the menstrual cycle of female athletes.

Despite numerous side-effects associated with these compounds, ongoing safety concerns, and potential negative consequences to both athlete health and performance, there has been – and remains little discussion or critical inquiry into the use of synthetic estrogen and progestin within the female athlete population. My doctoral project seeks to attend this gap.

Through conducting multi-method research, my project has traced the emergence and development of pharmaceutical reproductive control over the past century, and considered the potential influence of this practice on understanding of female health and performance. In addressing this area, I have drawn from a range of disciplines, including the humanities, social sciences, and applied sciences, and hope to contribute towards broader medical, sporting and gender histories of the body by examining the interactions between the realms of sport medicine, reproductive pharmacology, women's health, and sport performance.

Get in touch with Victoria!



victoria.felkar@ubc.ca



www.victoriafelkar.com

Victoria Felkar is a doctoral student within the School of Kinesiology at the University of British Columbia. She is an interdisciplinary researcher with a particular interest in the medicalization of women's bodies, the relationship between sport, medicine and pharmacology, and critical history of hormone manipulation. Funded by the Social Sciences and Humanities Research Council (SSHRC) in Canada, her doctoral project explores female use of pharmaceutical hormones in sport throughout the 20th century and into the present, and considers how broader socio-cultural and historical ideas about biological determinism, sex, gender and the 'natural' body have been built into doping discourse.



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Breaking through the assumptions: The role of testosterone in female muscle adaptation to exercise

By Dr Séverine Lamon, Senior Lecturer, School of Exercise and Nutrition, Deakin University, Australia

Where anti-doping science meets physiology

As a muscle physiologist with a background in anti-doping research, I have always had an interest in understanding the effects of human enhancement drugs (HED) on muscle physiology and performance. My current research investigates the role of testosterone in female athletic performance; a contentious topic that has gained substantial media attention through the world-famous case of South African runner Caster Semenya.

Testosterone is one of the most common HED. In 2017, 44% of all adverse analytical findings reported by the World Anti-Doping Agency (WADA) were related to androgenic steroid use [1]. Testosterone, its precursors and derivatives accounted for about 75% of these occurrences [1]. While the WADA does not provide a sex-specific breakdown for these data, anecdotal evidence suggests that androgenic steroid use might be less prevalent among females “since fewer women desire the masculinizing effects of (androgenic) steroids”[2]. Androgenic steroid use, including testosterone, does however occur in females and might be particularly prevalent in strength and power based sport communities.



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The use of non-prescribed testosterone is easily detectable through routine anti-doping tests. Testosterone (T) and Epitestosterone (E) - an endogenous epimer of testosterone - are measured in urine to calculate the T/E ratio. If this ratio is atypical, a confirmation test is performed. The latter, based on isotope ratio mass spectrometry (IRMS), allows to differentiate between endogenous (naturally occurring) and exogenous (pharmacologically administered) testosterone [3]. The presence of exogenous testosterone in urine is essential to return a positive result. Indeed, some individuals, males and females, naturally present with high levels of endogenous testosterone without having ever consumed androgenic steroids.

The issue of female hyperandrogenic athletes

These athletes, called “hyperandrogenic” are the focus of my research. Male athletes with naturally occurring high testosterone levels are allowed to compete normally. In contrast, female hyperandrogenic athletes are at the centre of a conundrum of sporting regulations that is best exemplified by the Semenya case. Because their natural testosterone levels are above an arbitrary threshold of five nmol/L, females such as Semenya are banned from competing in a series of World Athletics (formerly IAAF) events including 400 m, 400 m hurdles, 800 m and 1500 m [4], unless they choose to pharmacologically reduce their testosterone levels [4].

The ethical aspect of this ruling is beyond the scope of my research but calls the question of what constitutes an “unfair” advantage in sport: shorter Achilles and an uneven stride (Usain Bolt)? A perfect legs/torso ratio for swimming (Michael Phelps)? A shorter EPO receptor protein (Eero Mäntyranta)? The list is endless. From a performance perspective, the World Athletics ruling is however based on the single assumption that testosterone levels directly determine athletic performance in females. My research, funded by the International Olympic Committee, challenges this assumption.

Testosterone, the major male hormone, exists bound to transport proteins or in a ‘free’, unbound form. Upon binding of endogenous or exogenous testosterone to a specific receptor, the androgen receptor (AR), a signal is being sent to the muscle cell to activate the molecular pathways that trigger muscle protein synthesis. More proteins are being synthesised in the muscle, and muscle hypertrophy occurs. As a result, the muscle grows and becomes stronger. This all seems pretty simple, right?

Let us now have a look at what happens when testosterone cannot perform its job in the muscle. Androgen receptor knock out (ARKO) mice are genetically modified mice that do not produce the AR. When compared to normal male mice, male ARKO mice lose up to 20% of their muscle mass and strength [5]. This is expected, since testosterone does not have a receptor to bind to anymore. Surprisingly though, this is not observed in female mice, and female ARKO are as strong and muscular as their control counterparts. This suggests that testosterone may not be necessary to reach peak muscle mass and strength in females.

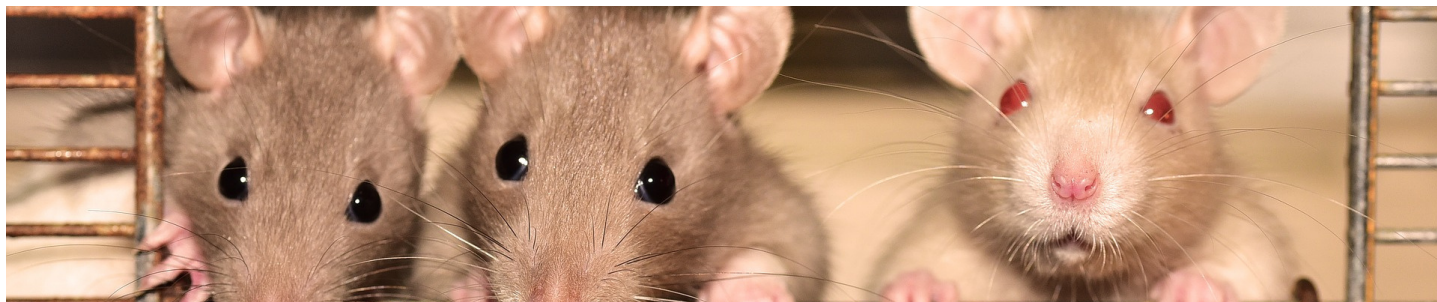


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Breaking through the assumption

Our human data align with this hypothesis. At the population level, we have recently shown that testosterone levels are not associated with indicators of muscle mass or strength in a cohort of 753 pre-menopausal females [6]. This is in contrast to males, where a positive relationship exists between testosterone concentrations, lean body mass and muscle strength [7]. Our pilot physiological data, collected in a tightly controlled environment, confirm these findings. Testosterone levels did not correlate with thigh muscle cross-sectional area, one repetition maximum (1RM) strength or muscle power in young, healthy females (n=11).

More interestingly, after 12 weeks of structured resistance training aimed at maximizing muscle mass and strength gain, testosterone levels did not determine how much our participants increased their muscle mass, strength and performance. Our study is unique because all external parameters that may influence muscle mass and muscle strength were tightly controlled.

Our participants were all untrained, ruling out a training effect. We controlled what they ate, how much they slept, how much activity they performed outside the lab, as well as their medications and menstrual cycle. This indicates that we are able to tease out the mechanisms of testosterone action alone with a high level of certainty.

While the World Athletics rules suggest that testosterone is a direct determinant of muscle performance, my research indicates that this relationship is not so simple.

The literature suggests that the female sex hormones oestrogen and progesterone may take over some of the anabolic role of testosterone in young females (reviewed in [8]). The non sex-hormone growth hormone (GH) may also play a role, via the stimulation of insulin-like growth factor-1 (IGF-1) secretion in the liver, which also triggers muscle protein synthesis and hypertrophy.



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In my research, we also found that sex-hormone binding globulin (SHBG), a testosterone-binding protein, was negatively associated with both lean mass and upper body lean mass in females, suggesting that the unbound or ‘free’ testosterone pool may play a more important role in the regulation of female muscle mass compared to the total testosterone pool [6].

A limitation of my study is that most of my participants would not be classified as hyperandrogenic according to the World Athletics rules. It is possible that, past a certain threshold, testosterone may have a different effect on female muscle physiology. A recent study tested this hypothesis by administering exogenous testosterone to females for 10 weeks in order to approach the five nmol/L threshold [9].

Following 10 weeks of this treatment, the authors found changes in body composition and running time to exhaustion. Surprisingly though, there was no change in VO₂max, Wingate performance, knee extension strength, squat jump and counter movement jump [9]. These indicators are direct markers of muscle aerobic and anaerobic performance, which are critically important in athletic events ranging from 400m to the mile. These findings reinforce my hypothesis that testosterone is not a direct determinant of muscle strength and performance in females and reiterates the need to challenge the current World Athletics rules.

Future directions

My research is important as it fights for the right of a cohort of naturally gifted female athletes to compete in their chosen athletics events, despite their naturally high testosterone levels. It will also create a wealth of novel knowledge about the physiological role of endogenous and exogenous testosterone in female muscle adaptation and challenge the current assumption that ‘the more the better’.

Finally, we will aim to determine whether alternative biological markers can be individually or collectively used to predict muscle strength and performance in females. This might include some of testosterone precursors or metabolites, but also molecular and epigenetic markers including gene expression, protein activation, miRNA expression or DNA methylation. In doing so, my project will provide the building blocks for implementing new regulations aimed at protecting and providing a fairer treatment of hyperandrogenic athletes in elite sports.



Dr **Séverine Lamon** is an Associate Professor within Deakin University's School of Exercise and Nutrition Sciences in Melbourne, Australia. Severine is a muscle physiologist with an anti-doping background, and she developed an original anti-doping test as part of her PhD within the Swiss Anti-Doping Laboratory. For the last decade, her main research focus has been the regulation of skeletal muscle mass in health and disease. She has established a practical framework to investigate the regulation of skeletal muscle mass in females, and has a particular interest in understanding the molecular role of testosterone in female skeletal muscle adaptation.

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Treatment and enhancement options for sexual interest and arousal issues in women

By Frances Quirk, Professor, New England Institute of Healthcare Research, University of New England, Australia

If you are a woman who is less than satisfied with your level of sexual interest or sexual responsiveness/arousal - where do you look for a solution? Is there a drug, a device (other than a vibrator) or a complementary or alternative treatment that could increase or enhance your sexual function and satisfaction? That was the question I was focused on nearly twenty years ago when I was working in a Research & Development team in Big Pharma investigating the utility of a phosphodiesterase type 5 (PDE-5) inhibitor for the treatment of Female Sexual Dysfunction (FSD). For a variety of reasons the programme did not reach completion, pardon the pun, and a regulatory package was not submitted.

Male sexual desire and arousal vs female sexual desire and arousal

At the time our own work and work across international research groups was highlighting that whilst the underlying physiology of male and female sexual dysfunction was very similar the experience and perception of sexual functionality or dysfunction was very different, and highly dependent on gender (1). In the case of sexual arousal, men have a ready, visual biomarker of the availability or lack of genital circulatory, neurological and physiological arousal response- the quality of their erection. Women have to rely on sensation, or lack of, perceptions of genital responsiveness and more generalised cognitive and physiological arousal to assess their own state of sexual functionality (2, 3).

The more diffuse nature of female sexual arousal and responsiveness and psychosocial and cultural influences was recognised with the development of new measures that assessed female sexual function in a way that recognised both these discrete phases of their sexual functionality, their interrelationship and the potential impact of broader external factors (4, 5). This was most notable in the recognition that unlike male sexual desire and arousal, female sexual desire and arousal was more likely to be harder to disentangle and that arousal more frequently preceded desire (1, 2).



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A person-centred assessment of female sexual function

A necessary prerequisite for any research or clinical trial assessing female sexual function is an acceptable, relevant and meaningful endpoint and a validated way of measuring it and any change. The new measures identified these endpoints and allowed for a more person-centred assessment of female sexual function, and dysfunction (4, 5).

These changes also led to greater understanding of the female sexual response cycle from the perspective of assessment, intervention, potential treatments and enhancement. These changes to the understanding of female sexual function and responsiveness also led to changes in the Diagnostic and Statistical Manual IV and V categories and definitions for FSD and impacts in clinical practice and sexual history taking (6, 7, 8).

Treatments and potential enhancers of female sexual function

Treatments for female sexual dysfunction and potential enhancers of female sexual function have, to date, focused on three targets; improving peripheral vagina/clitoral blood flow (e.g. PDE5 inhibitors), improving the reproductive hormone milieu either locally or systemically (e.g. estrogen (e.g. Vagifem), testosterone) and enhancing central nervous system response (e.g. flibanserin and bremelanotide) (9-15). With the passing of nearly 20 years one might expect significant advances to have been made in an area so closely related to women's sexual quality of life and interpersonal relationships- incredibly, that is not the case.



Photo by Olga DeLazence on Unsplash

Two drugs have been approved by the FDA in the last 5 years, flibanserin in 2015 and bremelanotide in 2019, both of these drugs have Female Hypoactive Sexual Desire Disorder (HSDD) as an indication, ironically HSDD is no longer included as a diagnostic category in DSM V (14, 15, 16). Both of these drugs have the central nervous system as a target, bremelanotide is a melanocortin receptor agonist that modulates the neurotransmitters involved in the sexual response, flibanserin has high affinity for serotonin receptors and is a 5-HT-1A agonist and 5-HT-2A antagonist. Both of these drugs have only been approved for pre-menopausal women (17). Both of these drugs also have quite significant side effects; nausea, dizziness, somnolence, central nervous system depression, hyperpigmentation and one of them has a black box warning to avoid alcohol whilst taking it- where dosing is a daily continuous schedule!

So, if you haven't reached the menopause yet, are willing to give up alcohol to take a daily tablet or are willing to give yourself an injection 45 minutes before any anticipated sexual activity and limit your activity to eight times a month, and have \$400 a month to spare then your sexual interest and arousal problems are sorted. The less than user-friendly nature of these drugs approved for Female Hypoactive Sexual Desire Disorder is reflected in the reportedly low number of prescriptions written and the lack of widespread regulatory approval beyond the USA.

It is surprising that there are no currently approved treatments for postmenopausal women with sexual dysfunction, women in this cohort are particularly vulnerable because of decreasing oestrogen levels and the consequent impact on sexual interest and arousal. The premise, promoted by some journalists, that female sexual dysfunction doesn't really exist and is a construct of the pharmaceutical industry would seem to be undermined by the lack of attention paid to postmenopausal women. This large and potentially profitable pharmaceutical user group, constitute a neglected population in terms of available products to address decreased sexual interest and arousal (18,19).

Use of natural or complementary remedies

There are no FDA-approved drugs, products or devices to treat or enhance decreased sexual interest and arousal among postmenopausal woman, and there is only limited choice for premenopausal women. This may explain why many women turn to natural or complementary remedies to enhance or improve their sexual functionality. Natural solutions may also be perceived as preferable when alterations in sexual function are a side effect of a prescribed drug (e.g. antidepressants) (20). However, there are few well-designed, double-blind, placebo-controlled trials of natural remedies for sexual dysfunction or enhancement among women. With reported high placebo response rates (25% to 50%) in this area, the need for randomized, placebo-controlled studies is important to demonstrate the safety and efficacy of complementary/natural solutions.



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"There are no FDA-approved drugs, products or devices to treat or enhance decreased sexual interest and arousal among postmenopausal woman, and there is only limited choice for premenopausal women. This may explain why many women turn to natural or complementary remedies to enhance or improve their sexual functionality."

Even in the absence of data to support safe use an increasing number of women are choosing to self-medicate with natural over-the-counter treatments, often without informing their doctor. This uninformed and unregistered use may increase the risk of adverse drug-drug interactions (20). None of the current products used by women to enhance sexual function have safety data for women who are pregnant or breastfeeding and as such are not advised for women in these groups. So, our potentially treatable population gets even smaller, premenopausal women who are not currently pregnant or planning to become pregnant, or who are breastfeeding.

Some of the natural products that do have available clinical trials data demonstrating improvements in sexual satisfaction include L-arginine and ginseng. L-arginine is more commonly used in combination with other products, such as ginseng and ginkgo (e.g. ArginMax) and in clinical trials for pre, peri and post-menopausal women L-arginine supplements have demonstrated improvement in sexual desire, frequency of intercourse and satisfaction with sexual relationship compared to placebo. However, the safety profile of L-arginine does give cause for concern due to increased production of nitric oxide, which may lead to side effects such as diarrhoea, flushing and hypotension (21).

From a recent meta-analysis, ginseng demonstrated positive effects on sexual function for both pre- and post-menopausal women but this may vary depending on the type of ginseng, for example, Korean red ginseng may be more effective for menopausal women (22). Both ginkgo and maca (also known as Peruvian ginseng) have been promoted as potentially beneficial for improving sexual functioning and fertility but there is limited or inconclusive clinical trial evidence and concern about the relative lack of data in women.

Other treatments with limited or no clinical trial evidence to support their effectiveness but that are popularly, often culturally specifically, used include; dehydroepiandrosterone (DHEA) and dehydroepiandrosterone sulphate (DHEAS), Puncturevine (*Tribulus terrestris*), red clover (*Trifolium pratense*), black cohosh (*Cimicifuga racemosa*) and chasteberry fruit (*Vitex agnus-castus*) (20). Acupuncture, yoga, transcutaneous electrical nerve stimulation, mechanical vibration, clitoral vacuum engorgement devices and transcranial photobiomodulation with near-infrared light have all been applied to the problem of female sexual dissatisfaction with varying degrees of success and quality of evidence (20, 23-25).

From a brief review of the limited available evidence for pharmacological treatments with regulatory approval to popularly reported natural products, supplements, techniques and devices to improve or enhance women's sexual interest and responsiveness we don't seem to be any closer to a safe, effective, cheap, broadly applicable solution than we were 20 years ago. For a wicked problem that affects the sexual lives and quality of life of many women, their perceptions of their sexual identity, agency and satisfaction and their interpersonal relationships that doesn't seem like a satisfactory conclusion to an already decades long story.

Professor **Frances Quirk** is a Chartered Health Psychologist, Behavioural Scientist and Sexologist who has worked across the Higher Education, Public Health and Pharmaceutical Industry sectors in the UK, US and Australia. Frances spent 6 years researching women's sexual arousal and interest difficulties, interviewing women across the world to better understand their experience of a lack of sexual interests or responsiveness and developing two outcomes measures to be used in clinical trials. These two validated measures, the Sexual Function Questionnaire (SFQ) and the Sexual Quality of Life - Female Questionnaire (SQOL-F) have been used across the world to assess the effects of new products and treatments on women's sexual function.



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NEIHR
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Some drug use is more deviant than others: Discussing the gender gap amongst IPED users

By Dr Charlotte McLean & Dr Jennifer Germain, Public Health Institute, Liverpool John Moores University

There exists a wide range of image and performance enhancing drugs (IPEDs) that may be utilised by both competitive and recreational athletes as well as those seeking body enhancement. Aesthetic sports such as bodybuilding and contemporary society as a whole place a high value on the exterior territories of the body, which is upheld as a symbol of the self in the modern world. A flawless lean and muscular physique in the sport of bodybuilding helps to communicate the prestige and authority of its owner, while affirming the truth of the social symbolic system that privileges one physique over another [1].

However, what is not present within this value system is gender neutrality. In general drugs have a culturally determined hierarchy, with some being viewed as more ‘polluting’ than others and this effect can be more significant for women [2]. Hence, women using IPEDs are often judged more harshly than their male counterparts, especially when their drug use challenges gender normativity, as is the case for anabolic androgenic steroids (AAS). Such appraisal comes both from outsiders and from those within the drug using communities and cultures within which these women reside creating a gender gap [2].

The Muscular Ideal

Female and male hyper-muscular bodies are framed differently with respect to the level of deviance they embody, the agency present, and the degree to which they uphold the process of gender [3]. This is especially true for women engaging in bodybuilding, which is stereotypically viewed by outsiders as a masculine pursuit. Furthermore, while the sport of bodybuilding bestows a great deal of capital on lean and muscular bodies, the degree of muscularity that is valued and acceptable is in constant flux [4].

For example, in 2000, the International Federation of Bodybuilding and Fitness (IFBB) who control the prestigious Olympia title updated their judging criteria to include overall appearance. Women would therefore be judged on their face, makeup and skin tone alongside symmetry, presentation, separation, and muscularity. However, the IFBB stipulated that the latter should ‘not be too extreme’, a first hint at a move to decrease muscularity in the women’s classes [5]. This was more explicitly emphasised in 2005 when the 20% rule was announced, dictating that female bodybuilders across all divisions decrease their muscularity by this percentage [6].



Photo by Alora Griffiths on Unsplash

Thus, bringing about a rise in the popularity of the less muscular and more feminine embodiments of bodybuilding under the titles of fitness, figure [body fitness], bikini and more recently wellness, and the relative demise of traditional hyper muscular female bodybuilding divisions. Thus while images of hyper muscular females may still be considered deviant, particularly within mainstream culture [6], slogans such as ‘strong is the new skinny’ are gaining traction among other fitness and sporting communities such as cross fit, where fit, muscular and lean bodies are readily embraced.

The nature of the drugs taken can also be important, for example, women’s use of male hormones to increase muscularity in the form of AAS. AAS directly impact the potential for reproduction, while engaging in a sport that diverts attention away from family life may be seen as contaminating this private space [3]. Indeed, female AAS users threaten the gender order through their use of AAS, which is defined as ‘unnatural’, resulting in further demonization.

A male bodybuilder may also be viewed as deviant in his drug use as his muscularity begins to exceed the ‘natural’ limits of possibility as seen on the professional competition stage. However, men’s use is more acceptable as either a sporting pursuit or a heroic one [7]. Indeed, even when a man’s use is not for competition, it is more legitimised and acceptable than it is for a woman. Even amongst peers within the bodybuilding community, female recreational AAS use was often seen as being for the “wrong reasons” [2].

Highlighting an inherent gendering process with respect to the use of these compounds [8], where cultural boundaries are more obviously classified for women. This may be because the use of male hormones is viewed as ‘unnatural’ and a pursuit that directly impacts the potential for reproduction, rendering them even less acceptable when used outside of competitive engagement [3].

Women are therefore open to be labelled deviant for their pursuit of muscularity as well as for their choice of drugs; a double deviance that has been highlighted in the literature [9]. This can lead to a shroud of stigma and taboo, resulting in a veil of secrecy or the downplaying of use to everyone except trusted cultural insiders. Although even within the culture, women are not immune to such labelling and may be subject to a third tier of deviancy imposed upon them by their peers should they choose to pursue more muscular class divisions.

Indeed, many women choose a line that they do not dare to cross, as to do so means stepping into ‘freakdom’, a line they also judge other women against [10, 11]. As a result, women engaged in bodybuilding and associated drug use must participate in much more corporeal management, inevitably experiencing different body politics to their male equivalents, and these differences should be acknowledged.

The Thin Ideal

These attitudes are not confined to muscle building drugs, with similar attitudes present across online forum discussion of women using 2,4 dinitrophenol (DNP) to boost weight loss [12-14]. DNP is a manufactured yellow chemical first used during World War I in the munitions industry [15-17]. Whilst DNP is used as a fungicide, preservative, and insecticide [18-21] it also works as a weight loss agent by increasing metabolism through inhibiting the mitochondria from making adenosine triphosphate (ATP), which results in heat being produced instead of ATP. This thermogenesis and subsequent fat burning leads to weight loss [20, 22]. Whilst DNP was banned for weight loss use in 1938, it continues to be available to purchase online and is popular within bodybuilding communities [23, 24]. However, DNP is extremely toxic in overdose, with a classic symptom complex associated with phenol-based products combining hyperthermia, tachycardia, diaphoresis, and tachypnoea, eventually leading to death [16, 25].

Male accounts of DNP online are plentiful and advice given on dosage and use are usually geared towards male norm models. Conversely, female accounts and experiences online, whilst still evident, are met with far greater judgement and criticism than are men's. For women using DNP for weight loss only, they are considered deviant as whilst they are aspiring to meet culturally and socially accepted norms of the female body, i.e. slim and toned, the risks they are seen to be taking are considered at odds with their roles as mother and caregivers. They are also more likely to be seen as lazy or looking for a quick fix than their male counterparts, and, similar to those using AAS, viewed to be using for the 'wrong reasons'.

For female bodybuilders, who may be using DNP alongside muscle building drugs as described earlier, this deviancy is threefold. Female users of DNP are seen as being deviant for taking enhancement drugs, judged for their use in male dominated spaces where 'cultural manspreading' is pervasive [26]. They are also, as with users of AAS, deviant because they are not subscribing to the Western idealised female body shape. Finally, they are deviant simply because they are women and seen to be putting themselves at what is considered to be unnecessary risk in pursuit of their desired physique.

The women in these online communities were constantly overshadowed by male voices, shouted down and told that drugs of this nature were not for them. This caused tension and frustration for women in these communities, leaving them with little or no support in their use of DNP.

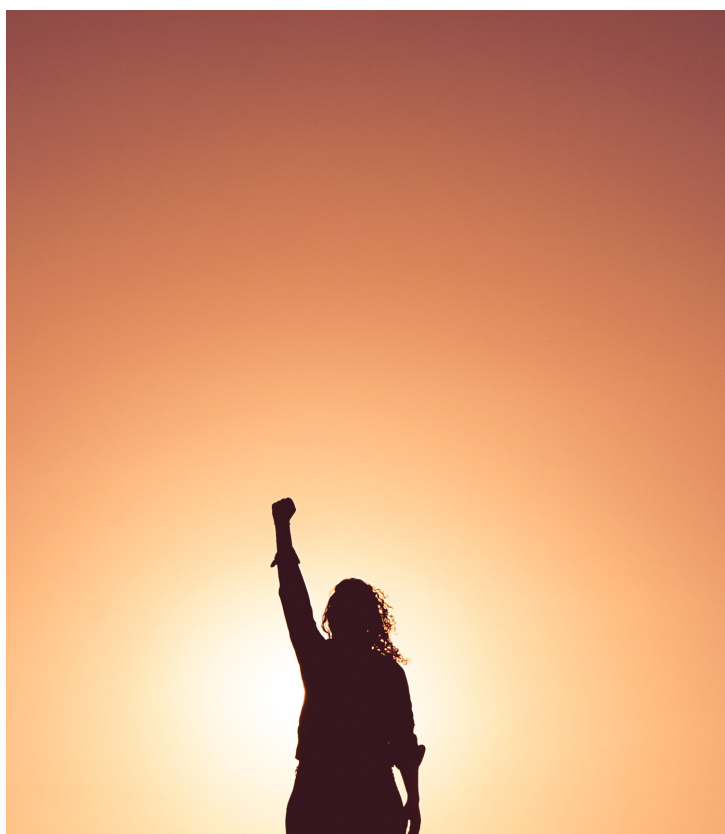


Photo by Miguel Bruna on Unsplash

Conclusion

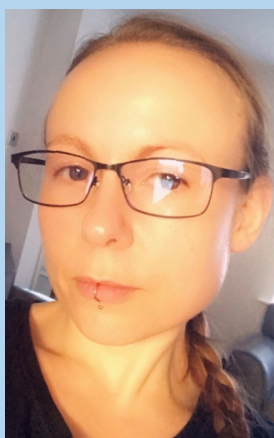
Body modification practices aimed towards muscularity and leanness, as well as the pursuit of the thin ideal, can often be subject to harsher judgement from both insiders and outsiders when practised by women. This is especially true with respect to the use of IPEDs to aid either pursuit. This stigma may result in women being less likely to openly talk about these issues not only with those outside the community but also with peers. The issues surrounding gender are therefore important to consider within what is already an understudied population when it comes to the provision of adequate harm reduction as well as prevention and treatment seeking. Greater understanding of the issues women face and the barriers they overcome during the decision to use IPEDs may also provide useful insights from a public health perspective.

However, to achieve this, we must first address the paucity of data that exists with respect to women's drug using experiences within a number of different population groups. Doing so would provide a greater depth of knowledge from which we can determine more tailored and holistic policy outcomes.

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Dr **Charlotte McLean** has recently completed her PhD within Liverpool John Moores University exploring women's use of anabolic-androgenic steroids and growth hormone within bodybuilding culture. The research combined ethnography, in depth interviews and photo elicitation to identify the specific, yet unquantified needs of this hard to reach population, providing a rich insight into the complexity surrounding the issue of steroid use in female bodybuilders.



Dr **Jennifer Germain** works at the Public Health Institute, Liverpool John Moores University as a project manager. Her PhD which was completed in 2018 looked at the female use of unlicensed weight loss drugs including 2,4 dinitrophenol, rimonabant and sibutramine. She has an interest in body image, enhancement drugs, online research and all things public health.

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Early years as an athlete and later research interest in performance and appearance enhancing substances

By Dr Azenildo Santos

My involvement in sports began at Technical School during the Electrotechnical Course in 1984 when I was called for the Athletics' team as a long jumper and sprinter. I ran the 100-meters, 4 × 100-meter relay, and occasionally the 4 × 400-meter relay. I began running in an impoverished community that had only a coal cinder track. Participating in sports motivated me to switch from majoring in electrical engineering to pursuing a degree in physical education. Personally, I was a huge fan of Jesse Owens and Ben Johnson. Since then, as an athlete, and later as a sports science student, I've always wondered how these great athletes were able to run so fast?!

As I learned more about bioenergetics, physiology, and sports nutrition, my colleagues from track and field, as well as my schoolmates, began to ask for my advice on how to improve performance. Consequently, I began compiling a library of articles from sports magazines and scientific journals. In my country of Brazil, the use of PAES was not well known in academic circles. However, I was able to find books and articles from other countries on how to obtain the “ergogenics edge” and on the use of anabolic-androgenic steroids (AAS). AAS use was generally not illegal nor considered doping by sports organizations. The AAS was added to the IOC list of prohibits substance in the years of 1976. AAS were sold freely without prescription in pharmacies throughout Brazil. Later, the use of pro-hormones began as a new supplement and were widely accepted by athletes.



Photo by Adi Goldstein on Unsplash

I began my career as a personal trainer and fitness coach and the experience put me in contact with many athletes and bodybuilders (both recreational and competitive). I found that in the gym, recreational athletes talked more about supplements and AAS than did elite athletes. So, I changed my focus to asking why so many recreational, non-competitive weightlifters and bodybuilders searched for ways of improving their appearance? From biochemistry and physiology I moved to the psychology and sociology of sport. Meanwhile, I finished my undergraduate degree and continued working in gyms and as a coach, but with one more goal: to participate in the Olympic Games!

The standard of living in various geographical regions and sports programs in Brazil is diverse and, oftentimes, less than ideal. I competed and I trained hard with great coaches and athletes. I travelled throughout Brazil working and training. During this time I was very fortunate to watch two outstanding Olympic athletes perform: Canadian Ben Johnson (following his 1988 doping suspension) and American long jump athlete, Larry Myricks.



Queen of the Drums in Rio 2013. Photo by Azenildo Santos

In 2003, I completed my athletic career with a personal best of 10.5 sec in the 100m. Sadly, it was not fast enough to make the national team, nor fast enough to continue pursuing my Olympic dream. Unfortunately, in Brazil there is little to no financial support for sports other than soccer. Thus, I moved on with my professional career and my formal education.

Next steps in my career of PAES research and publishing

My interests became deeper when I met a man who called my attention to the physical and psychological effects of AAS, Professor Michael S. Bahrke. Bahrke had conducted numerous PAES research projects and surveys among athletes in the United States that were later published in medical and scientific journals and books. I reached out to Professor Bahrke, who kindly mailed me reprints of many of his articles. Of course, all of this added to my compilation of research articles and books that resulted in my own book ([O Mundo Anabólico, 2003](#)), which was the very first book on AAS published in Brazil. Since then, Professor Bahrke became not only a reference source, but also a supporter and contributor.

As a result, my own studies began to investigate the use of AAS among non-athletes or, as we referred to them, recreational practitioners. AAS often times connote a “taboo”. However, I began a pilot research program in local gyms (schools were reluctant to permit such research then and remain so) because I had personal contacts with several coaches and gym owners/managers. They confessed that there was a need for more information on PAES. The results of my early research raised the question as to why are non-athletes so interested in altering their appearance? I began searching for a post-graduate program to obtain financial support to investigate the social, psychological, and physical effects of pursuing the “muscular ideal”.

In 2007, a second edition of my book was published. I also returned to academia after finishing a second graduate program in sport physiology. However, my ultimate goal was to obtain a doctoral degree. That began in 2010 following several presentations abroad. During my doctoral program, and at the invitation of Professor Stan Einstein, founder and editor of the journal *Substance Use & Misuse*, Professor Bahrke and I co-edited a Special Issue of the journal on [“Doping in Sport from the Brazilian Perspective”](#) (SUM. 49;9, 2014).

Further, it was the view of Professor Einstein that the special issue coincide with Brazil hosting two of the world’s most important sports events: the World Cup (2014) and the Olympic Games (2016). In 2014 I completed my doctoral program at the Universidade Federal da Bahia, with a scholarship for a stage of research at Goldsmiths University, Department of Sociology, University of London. The focus of my dissertation was an ethnographic experience among bodybuilders that included body image and bodybuilding culture in three Brazilian gyms.

My experience generated many interesting findings about the culture, social conditions, training, supplements, AAS use, and black market (after 2004, in Brazil, anabolic steroid use was considered doping and purchase was by prescription only), and lifestyle. The research was conducted with male participants. However, it quickly became clear there was growing and open use of AAS among women as well. In parallel, another phenomenon appeared that we began calling “aesthetic doping”. In other words, the use of AAS, not for muscle hypertrophy, but for muscle “sculpting”. As we discovered, this was a technique/method of muscle enhancement/appearance that was being used by many competitive bodybuilders. Thus, this became the theme of my post doctoral research.



New Brazilian Beach Body Style. Photo by Azenildo Santos

Future research with PAES: call for collaboration

The pursuit of muscle hypertrophy to enhance body image among men may be comparable to the phenomenon of weight loss among women that has evolved over many years. As we observed during our research among women ([Journal of Substance Use, 22:3, 2017](#)), part of the Brazilian physical culture is for people to display their aesthetic and physical shapes on the beaches. This is the culture among Brazilian women who wear the typical Brazilian bikini at the beach, especially during Carnivale (Picture .1). However, recently Brazilian women have begun presenting a very muscular body, with a well defined abdomen, massive thighs, and a huge gluteus maximus.

Currently, this is the type of body we often observe in the gyms and on the beaches (Picture .2). Nonetheless, the effects of AAS use in women is more often detected because of the muscular development and secondary sex characteristics that are visible for those who know the effects (e.g., deepened voice, hypermuscularity, facial hair, and so on). With this increased emphasis on a new pattern of appearance among women, we are interested in partnering with others to explore this field. With the conclusion of the post doctoral program in 2018, I am currently searching for centers that might support this field of research.

Dr **Azenildo Santos**' research is focused on recreational and professional bodybuilders using performance and image enhancing substances and anabolic-androgenic steroids for ideal bodies and aesthetic purposes, also known as "aesthetic doping". He uses mainly qualitative methods, including ethnographic approaches, in his work. He authored his very first book and best seller on anabolic-androgenic steroids in sports in Brazil, called "O Mundo Anabólico", written in Portuguese. This book presents the results of the thesis entitled, "Body Image and Bodybuilding Culture in three Brazilian gyms: a qualitative analysis", which reports an ethnographic perspective and the bodybuilding culture.



Q&A with Kay Stanton, peer worker at Your Community Health in Melbourne, Australia

By the HEDN Board

Can you tell me about yourself and your work?

I am a peer worker from Your Community Health (formerly Darebin Community Health) at which I lead a steroid education program for over 23 years. Your Community Health takes a harm reduction approach to supporting people who use drugs and alcohol, including enhancement drugs.

I come from a bodybuilding background; I started competing in bodybuilding in my early 30s and whilst I no longer compete my interest in bodybuilding has never wavered. I still live and breathe bodybuilding, I train regularly and live the lifestyle. Coming from a bodybuilding background and being involved in the steroid education program allows me to help and guide people about their non-prescribed anabolic-androgenic steroid and other enhancement drug use. In that way they can make an informed choice as to what steroid products they elect to use and implement with their individual training regime.



Photo by Joshua Ness on Unsplash

How many people would you see or talk to about their anabolic-androgenic steroid use in a month?

Pre-COVID-19 restrictions, I would be involved with approximately 100 clients per month. This number includes individuals who I provide injecting equipment to, clients that I meet in the gyms that I visit in passing and who want information, clients who call me on the phone for harm reduction advice, and clients that are generated from my information sessions.

What are the common issues or questions that you get asked by the people you come into contact with?

Most of the common issues and questions are around:

- Product enquiries and what side effects to expect;
- Dosages;
- Post-cycle information; and
- Timeframes and strategies

What proportion of your clients are female? Have you seen any trends, or has the number been consistent over time?

This has always been a male dominated area, however, over the past 7 years, I have noticed that women are increasingly choosing to use anabolic-androgenic steroids. But as women generally do not admit to steroid use, it is difficult for me to give an accurate number. A rough estimate from watching the competitors in competitions and training in the gyms, I would guess that the number could be around 20-30% of those females may be using steroids and other enhancement drugs. The problem is that steroid use by women is more closeted than males and they will often use a male go-between to access the steroids and equipment (and therefore do not always directly engage with me). There is more stigma for a women than a male using steroids. Also, a lot of women are also in fitness jobs where this is often seen as a form of cheating. Even though it's not, as you still need to put in the hard yards and push yourself to the extremes.

Why do you think more women are choosing to use steroids? Is it related to bodybuilding competitions?

There is a competitive side to it in that muscular development has changed over the past 5-10 years. There are also increase in prizes and pro cards; as a result, much more women are coming through, there are more competitions than ever before, and more women are competing at all levels. On the other hand body image is an important aspect as well. They want to get to a size but always want to look bigger, but remaining to look feminine.

What are the issues that females speak to you about, and are these different from your male clients?

Issues that female clients talk to me about include what chemicals are relatively safe to use and what potential side effects are attached to using those chemicals. Women also ring me often about dosages, as this generally is much lower than what men use. Some women however call me well down the track and are concerned with the side effects that they are experiencing. They started using high dosages because either their partner or male associate has told them what to use, which increases the risk of, sometimes irreversible side-effects, such as deeper voices, and increased facial and body hair.

What are the common enhancement drugs that females use?

The types of enhancement drugs reported to be used female clients are:

- **Anavar** (Oxandrolone) is an oral steroid used to increase muscle mass.
- **Human growth hormone** (injected) is used for its anabolic effects and strength, to burn fat, and for weight loss.
- **Winstrol** (stanozolol) is an oral steroid used to increase muscle mass.
- **Thyroid tablets** makes your thyroid overactive, in that it burns off more of what you're putting in.
- **Clenbuterol** (oral), a β_2 agonist, is used for its anabolic effects, burning fat properties, removing of skin fluid, for weight-loss purposes, and stops the break down of muscle whilst dieting.

Are there any issues or harms that are unique to females? Are there any we don't think about that we should be more aware of?

Besides the usual (sometimes irreversible) masculine side effects (e.g. Increased facial and body hair, smaller breasts, a deeper voice and enlarged clitoris), there are also issues relating to body image. For example, women reporting to wanting to be excessively lean, which leads to extreme dieting and the use of diuretics/thyroid tablets, which can become highly problematic. Women also should be aware of not falling or being pregnant whilst using steroids as it may affect the development of the foetus.

What harm reduction advice do you give to women who use AAS and other enhancement drugs?

I generally give the following advice:

- Never to share injecting equipment or vials;
- Make them aware that they can't use what most males can use; even when using "milder" steroids it can end up causing (irreversible) side effects if not careful with the amount administered and the timeframes employed;
- Always research the product they are wishing to use as thoroughly as possible.
- For both male and female clients - it is good to have their bloods tested before starting steroid use to provide a baseline, and also to pick up any issues with regard to cholesterol, blood pressure, liver or kidney problems, which may be complicated further by their use of steroids.

What do you think needs to happen in terms of education when it comes to women who use AAS?

It would be wonderful to introduce steroid education into the secondary curriculum of high school students; for example, inclusion in health studies for both males and female student and for them to get an understanding of the risks involved. This is an area that I am particularly passionate about and would love to be involved in.

What is the research we should be doing when it comes to women who use AAS?

I think there should be research investigating women's body-image issues and why they feel the need to use chemical enhancement products. There is also a need to conduct research on the long-term use of steroids on a female's body and their psychological health.

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Upcoming Events and Conferences



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2020 was a strange year due to the COVID-19 pandemic, and whilst it is worth hoping that the situation gradually returns to near-normal in 2021, most conference organisers have played safe and postponed their conference activities.

Conferences:

25 Feb 2021, 7.30pm AUS time: HEDN Webinar: Enhancement Drugs & Women (online): <https://www.eventbrite.com/e/hedn-webinar-enhancement-drugs-women-tickets-136247169953>

6-9th April 2021: Inaugural International ECR and Student Conference: The International Society of Qualitative Research in Sport and Exercise: <https://www.grsesoc.com/ecr-and-student-conference>

April 15-16, 2021: International Conference on Doping in Sports and Anti-Doping (Lisbon, Portugal): <https://waset.org/doping-in-sports-and-anti-doping-conference-in-april-2021-in-lisbon>

June 2-4 2021: The International Society For The Study Of Drug Policy Conference (Aguascalientes, Mexico): <https://www.conference.issdp.org/>

November 23-24 2021: Global Education Conference, World Anti-Doping Agency: <https://www.wada-ama.org/en/events/2021-11/global-education-conference>

Let us know!

... if you are aware of any upcoming conferences and events

Achievements by HEDN members



*The human enhancement drugs network represents a diverse group of productive scholars from different academic disciplines. Below you can find the most recent work published by the members of the network.
Photo by Pexels from Pixabay.*

Peer-reviewed journals

Amaral, J. et al (2021). Effective treatment and prevention of attempted suicide, anxiety, and aggressiveness with fluoxetine, despite proven use of androgenic anabolic steroids. Drug Testing and Analysis, 13, 197-202.

Barnes, L.T., **Patterson, L.B.**, & **Backhouse, S.H.** (In press). A systematic review of research into coach perspectives and behaviours regarding doping and anti-doping. Psychology of Sport and Exercise.

Dinh, C.T., Humphries, S., & **Chatterjee, A.** (2020). Public Opinion on Cognitive Enhancement Varies across Different Situations. AJOB Neuroscience, 11(4), 224-237.

Dunn, M., **Mulrooney, K.J.D.**, Biddau, D., McKay, F.H. & Henshaw, R. (In Press). 'Bali over the counter': Exploring the overseas use and acquisition of anabolic-androgenic steroids. Deviant Behavior.

Fincoeur, B., **Henning, A.**, & Ohl, F. (2020). Fifty shades of grey? On the concept of grey zones in elite cycling. Performance Enhancement & Health, 8(2-3): 100179.

Germain, J., Leavey, C., **Van Hout, M.C.**, & **McVeigh, J.** (In press). 2,4-dinitrophenol: It's not just for men. International Journal of Drug Policy, 102987.

Mann, J. (In press). Cognitive enhancing drug use by students in the context of neoliberalism: cheating? Or, a legitimate expression of competitive entrepreneurialism? International Journal of Drug Policy, 102907.

Trabal, P. & **Zubizarreta E.** (2020) A Proposal for Theoretical and Empirical Extension of the Sociology of the Anti-Doping. Performance Enhancement & Health, 8(2-3), 100177.

Underwood, M., **van de Ven, K.**, & **Dunn, M.** (In press). Testing the boundaries: Self-medicated testosterone replacement and why it is practised. International Journal of Drug Policy, 103087.

Zandonai, T., Holgado, D., Ciria, L. et al. (In press). Novel evidence on the effect of tramadol on self-paced high-intensity cycling. Journal of Sports Sciences.

Other published articles

Sverkersson, E. & Henning, A. (2020). Bodies of knowledge: Women, ethnopharmacology, and online space [editorial]. *Performance Enhancement & Health*, 8(2-3): 100183.

Chatterjee, A. (2020). Smart Pills for Smart Work? Malleability in the public's acceptance of pharmacological enhancement. *Psychology Today*.

Webinars and other events

- Dunn, M. (2020). The life cycle of health and harm among PIED users. Run on behalf of Insight/ Australasian Professional Society on Alcohol and Other Drugs. <https://insight.qld.edu.au/training/the-life-cycle-of-health-and-harm-among-pied-users/detail>
- The presentations for the “the public health implications of anabolic androgenic steroid use” conference led by Jim McVeigh are now freely available online: <https://www.anabolicsteroids.org.uk/conference-2020-anabolic-steroids-uk-asuk/>

Tools for health professionals

- Check out the *GP Guide to harm minimisation for patients using non-prescribed anabolic-androgenic steroids (AAS) and other performance and image enhancing drugs (PIEDs)*, which is now freely available online via the Sydney North Health Network (SNHN). The Guide covers topics such as assessment, red flags and management tips, and has four skill-based webinars that cover a range of topics in this area (e.g. how to manage a patient who is not yet ready to stop).
- This Guide was developed by Dr Katinka van de Ven, Dr Beng Eu, Dr Eva Jackson, Dr Esther Han, Dr Nicole Gouda, Ms Pat Simmonds and Mr Craig Parsons. It involved an extensive review and consultations with health professionals working in this field. You can access the Guide here: <https://www.snhn.net/steroid-harm-minimisation/>.
A PDF-version will become available for download soon. Feel free to contact Katinka if you have any questions (K.vandeVen@une.edu.au).



Call for research collaboration!

HEDN member Michael Johansen has recently completed his data collection on a study involving AAS and non-AAS users, with the aim to develop understanding of support networks. He has transferred this data to NVivo for analysis, but **he is looking for seeking researchers to support his transcript analysis for publication**. As part of this research, he was able to gain access to copies of AAS drug diaries, which is being used as part of the triangulation process. For your help, you would receive authorship on the paper. Timeframe: analysis completed by summer

2021.

Contact Michael Johansen: michael.johansen@sunderland.ac.uk

Want to become involved?

Membership

HEDN is an international group of multi-disciplinary researchers with an interest in human enhancement drugs from various universities. We seek to strengthen working relationships between academic sectors, governmental agencies, NGOs, users groups and others interested in human enhancement drugs, performance and image enhancing drugs, and doping substances.

You can find the entire Human Enhancement Drugs Network on our website, where you can apply for membership: <https://humanenhancementdrugs.com/members/become-a-hedn-member/>

Follow us on social media to stay up-to-date!

Follow us via social media to stay up-to-date about the latest developments in the field of human enhancement drugs.

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