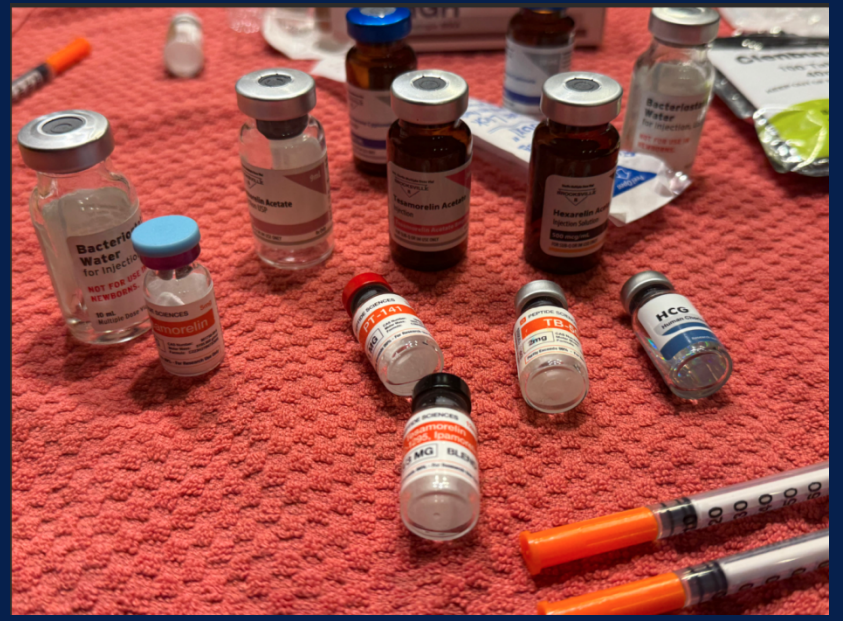
Clinical Insights on Emerging Misuse of Performance and Image Enhancing Drugs

Timothy J. Wiegand MD, DFACMT, FAACT, DFASAM
Jeffrey Brent, MD, PhD, DFACMT, FAACT
Stephanie T. Weiss, MD, PhD, FASAM, FAACT
Jason Kirby DO, MBA, DFASAM
Stephen M. Taylor MD, MPH, DFAPA, DFASAM



Presented at the American Society of Addiction Medicine 57th Annual Conference on Friday, April 24th -3:15 – 4:30 PT (Harbor: D-F) Level

Disclosure Information

- Presenter 1: Timothy J. Wiegand MD, DFACMT, FAACT, DFASAM – No

financial relationships to disclose

- Presenter 2: Jeffrey Brent, MD, PhD, DFACMT, FAACT – N financial relationships to disclose

- Presenter 3: Stephanie Weiss, MD, PhD, FASAM, FAACT –No financial relationships to disclose

- Presenter 4: Jason Kirby DO, MBA, FASAM
- -No financial relationships to disclose

- Presenter 5: Stephen M. Taylor MD, MPH, DFAPA, DFASAM
- -No financial relationships to disclose

Learning Objectives

- To provide Addiction Medicine practitioners with an overview of current PIED classes, mechanisms and risk-benefit profiles
- To review historical, epidemiologic and psychosocial correlates of Performance and Image Enhancing Drug (PIED) use and misuse, emphasizing parallels with substance use and behavioral addictions
- To discuss the regulatory, ethical, and diagnostic implications both in competitive sports and in non-athletes (or the ‘aging athlete’)
- To demonstrate, through case-based discussion and polling, clinical approaches for screening, counseling, and managing patients engaging in PIED use

Intro to PIEDs and Performance-Enhancing Drugs (PEDs)

What is ‘doping’?

What are the differences between PEDs and PIEDs?

“The use of performance-enhancing drugs like steroids in baseball, football, and other sports is dangerous, and it sends the wrong message — that there are shortcuts to accomplishment, and that performance is more important than character.”

Bush GW. State of the Union Address, January 20, 2004. White House Archives

History of PIEDs and Complementary Meds

- The first major wave of PED use was with peptide hormones, like growth hormone, erythropoietin (EPO), and anabolic steroids
- These became popular because A.) drug testing was just initiated at the 1968 summer and winter Olympics but limited to stimulants, sedatives, opioids, alcohol*
  - Very few positives: one famous athlete (+) for alcohol (Swedish pentathlete Hans-Gunnar Liljenwall)
  - Steroids not tested for until 1970's.
- Next came nutritional supplements, many of which became banned (e.g. ephedra, androstenedione), additional anabolic steroids 'the Clear'
- Current era characterized by Nextgen agents and less of a sports/bodybuilding focus and more rejuvenation and lifestyle medicine

But first the Athlete Biologic Passport (ABP)…

https://shepwedd.com/knowledge/sports-law-history-and-development-anti-doping-rules

Drug Testing First + what else: 1968 Olympics…

- Black Power Salute by 200 meter Olympic Gold and Bronze medalists Tommie Smith & John Carlos
- *Věra Čáslavská and the Soviet invasion of Czechoslovakia & silent protest during medal ceremony – *turned and bowed head during playing of Soviet National Anthem*
- Mexican student and labor union unrest led to gathering and massacre of 100s of attendees
- Drug testing- a Swedish pentathlon athlete tested positive for alcohol…

Gold medalist Tommie Smith (center) and bronze medalist John Carlos (right) showing the raised fist on the podium after the 200 m race

Plaza de las Tres Culturas, October 2, 1968

Case 1

Panelists:
a.) what are the ‘traditional’ PEDs and

b.) what is an Athlete Biologic Passport (ABP)?

- A 24-year-old elite wrestler is referred to a sports medicine/addiction medicine specialist who works in a private clinic.
- The athlete was ‘flagged’ for some “ABP irregularities,” and after further investigation, he admitted to past struggles with opioids, cannabis use (“off season”) and anabolic steroid use.
- He reported the ABP detected some “abnormal ratios, because I just got careless and this was probably meant to be…”

Characteristics of the First PEDs

- 1 – Anabolic steroids
  - Analogues of testosterone bind to the androgen receptor triggering anabolic effects, stimulate bone marrow, increase muscle growth and bone density
  - Testosterone: first used in 1930s with steroids initially used medically to stimulate bone marrow, muscle growth, wound/burn treatment.
- 2 – Erythropoietin (EPO) or “blood doping”
  - Increase in RBCs and oxygen carrying capacity – improves aerobic capacity (e.g., bicyclists w/ Lance Armstrong as the poster child)
- 3 – Growth Hormone (GH) and other endocrine peptides
  - Build more muscle and improve healing capacity (*though unknown if actually enhances performance due to limited evidence…)*

Case 1

ABP –main components 1

1.) Hematologic

- Monitors biomarkers related to blood doping

  Parameters include:

- Hemoglobin concentration (Hgb)
- Reticulocyte percentage (Ret%)
- Off-score = erythropoiesis index (a formula combining Hb and Ret%)

  Identifies unnatural increases in blood cells followed by sharp decreases (consistent with use of EPO or transfusion)

- Hematocrit (Hct)

Watson CJ, Stone GL, Overbeek DL, Chiba T, Burns MM. Performance-enhancing drugs and the Olympics. J Intern Med. 2022 Feb;291(2):181-196. doi: 10.1111/joim.13431. Epub 2022 Jan 10. PMID: 35007384.

Case 1
ABP main components 2

2.) *Steroid Module*

- Focuses on endogenous steroid profiles in urine
- Monitors ratios and levels of substances such as:
  - Testosterone
  - Epitestosterone
  - Androsterone
  - Etiocholanolone
- Abnormal patterns may suggest exogenous testosterone or other anabolic steroid use:
  - Oxandrolone
  - Nandrolone
  - Trenbolone
  - *Many others…*

Case 1
ABP main components 3

3.) Endocrinological/Other Modules

- **Used in some sports or federations for hormones such as**
  - **Growth Hormone**
  - **Emerging biomarker use**

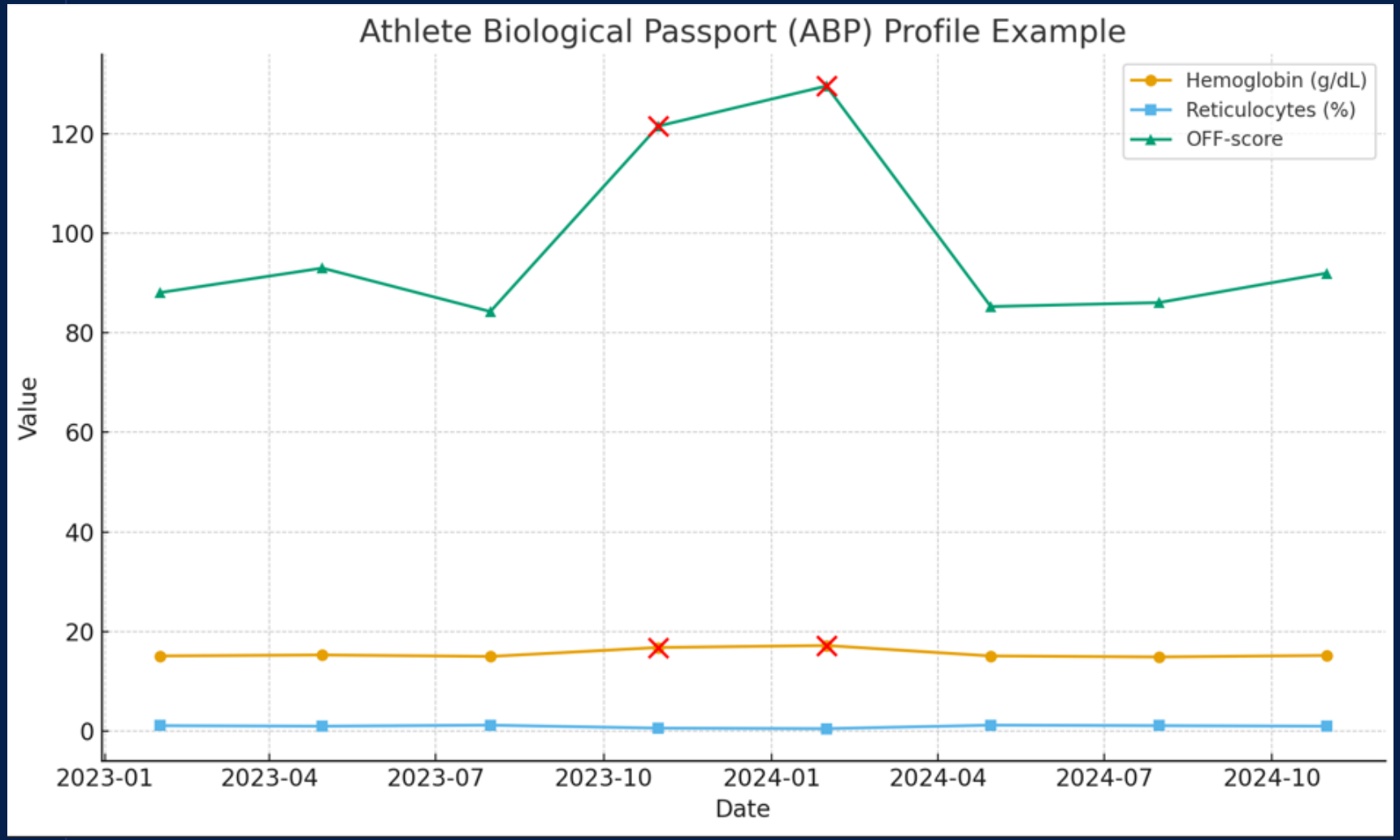
- **Constantly evolving - the main idea is to extend the ABP to cover a wider range of *physiological manipulations***

Case 1 – ABP example flagged for potential ‘doping’

Off-score calculation:

= [Hgb]-60 x √ Ret%

Normal Ret% in adults 0.5%-1.5%



The graph shows simulated hematological results: Hgb (>17 g/dL) and OFF-score (>120) highlighted in red as potential ‘doping’ episode(s)

Case –illustrating use of ABP

Example Case

An elite sprinter shows stable hematological values but in October, their **T/E ratio jumps from ~1.2 to 4.4**, later rising to **6.3**.

Panelists: What is the T/E ratio? What do these findings suggest, and what are subsequent actions?

The T/E ratio

- **T/E ratio: testosterone to epitestosterone**
  - Urinary concentration used to detect testosterone 'doping'
  - Epitestosterone is usually not affected by exogenous testosterone administration, making the ratio a key marker in the ABP
  - Therefore: if someone self-administers testosterone, the T increases but the E is not affected

- **T/E ratios typically 1:1 but can be somewhat higher (*flagged of > 4:1*)**
  - Higher T/E ratios are generally flagged for further analysis by the World Anti-Doping Agency (WADA)

ABP Violations

- **Most ABP violations are linked to intentional doping, but sometimes broader testing indicates substance misuse or dependence.**

- **Options for these athletes (in addition to sport participation penalties) include:**
  - 1.) National Anti-Doping organizations: USADS (U.S.), UKAD (UK, NADA (German7) –may initiate investigations and also refer athletes to treatment programs
  - 2.) WADA provides global oversight and can encourage rehabilitation–based approaches when other substance use or a SUD is suspected
  - 3.) Sports Federations/Teams – many professional leagues (e.g., IOC, FIFA, NFL, MLB) have joint treatment and counseling programs for athletes with SUD, including confidential rehabilitation referrals
  - 4.) Specialized Addiction Treatment Programs – athletes often referred to accredited sports medicine + addiction medicine centers, sometimes with confidentiality protections, to receive care for underlying SUD

Case 1 –the wrestler

- **Summary of Results:**
  - ABP findings over a year show fluctuating Hgb levels, with sudden spikes up to 17.8 g/dL and suppressed reticulocyte counts.
  - The OFF-score rose above 125, suggesting possible transfusion or EPO use
- **Outcome – the ABP expert panel ruled it an Anti-Doping Rule Violation**
  - The wrestler was provisionally suspended, and his competition results were annulled
- **During the investigation, it emerged that he had also been using stimulants for weight cutting and had developed dependence.**
  - (*He also had a prior history of tobacco, use, opioid use, and excessive alcohol use*).
- **He was referred to a sports-medicine/addiction clinic for treatment while serving his suspension**

A growing area of medicolegal or expert witness work

Adverse Effect of SARMs

- Endocrine
- Cardiovascular
- Hepatic–Drug-Induced Liver Injury

- Studied for use in burn patients and trauma for muscle growth and healing without risks of traditional anabolic steroids.

Panelists: How do SARMs compare to traditional anabolic agents in causing male sexual dysfunction if not used correctly (short bursts, appropriate Post Cycle Therapy) etc.. Does PCT apply to SARMs?

What are SERMs, and how have they been used?

Leciejewska N, et al. Mol Cell Endocrinol. 2023 Nov 1;577:112037. doi: 10.1016/j.mce.2023.112037. Epub 2023 Aug 3. PMID: 37543162.

When the SARM user becomes a patient

- Mostly male
- Median age 32
- Ave approx. 8 weeks of use at higher than doses studied clinically
- Most products studied are mislabeled for dose and/or contents

Vasireddi, et al. AJ Sports Med 53, 99-1009 2025, DOI: 10.1177/03635465241252435

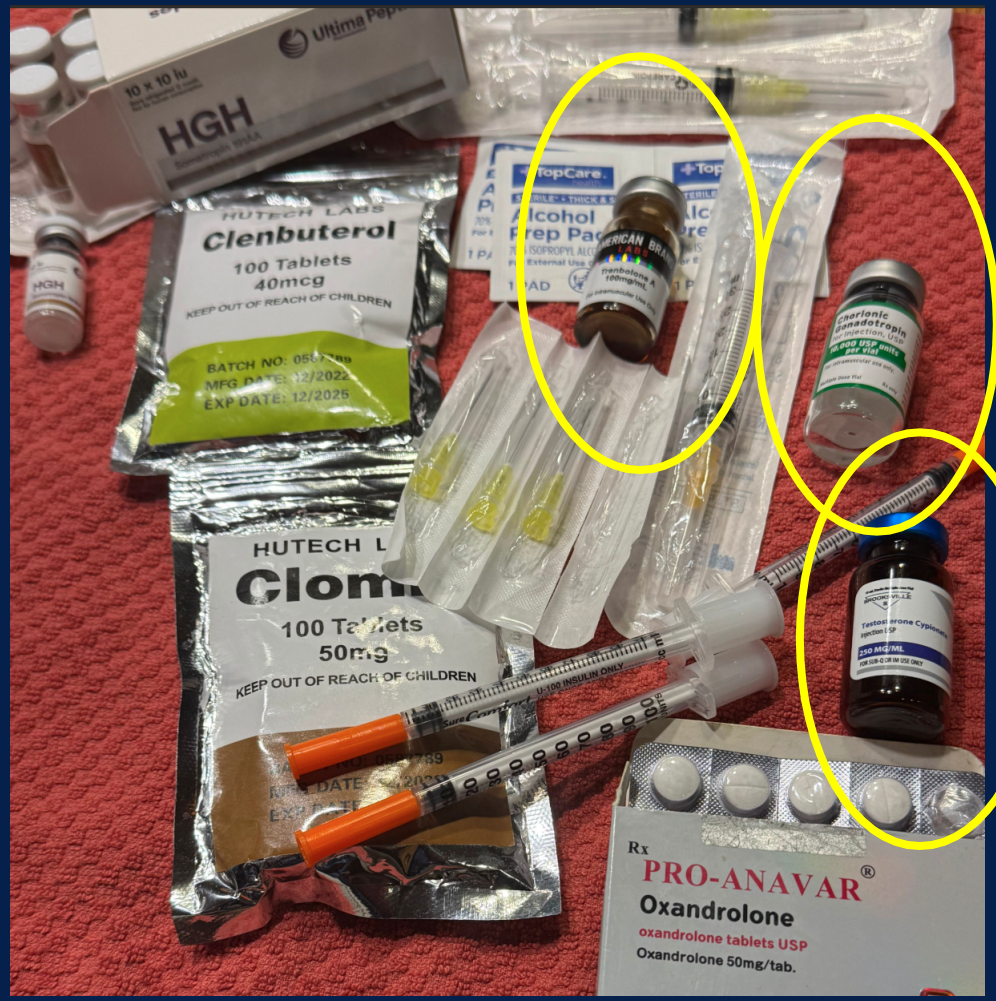
Peptide Therapy

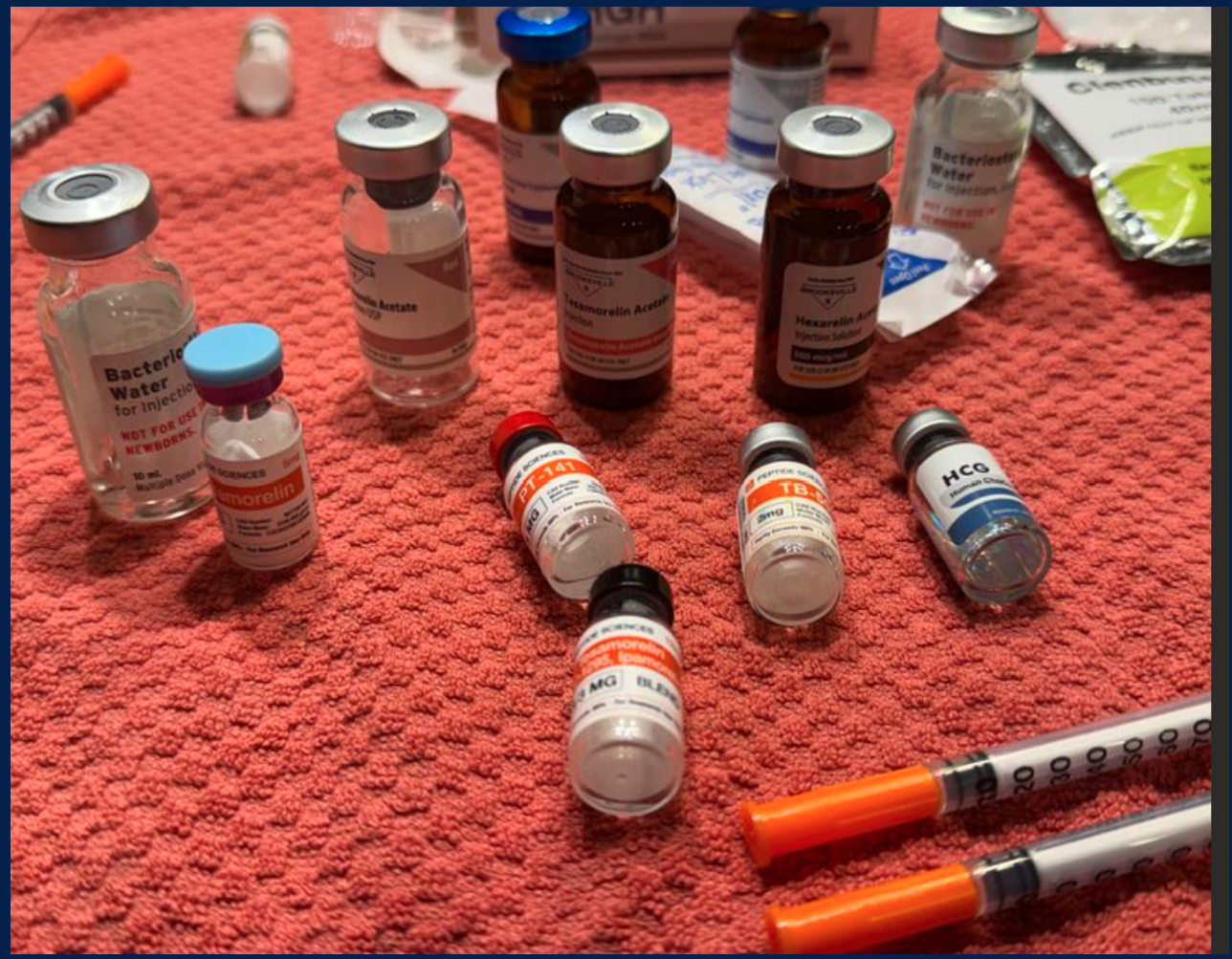
NB: This statement is NOT advice from the presenters! It was taken from one of the websites offering clinic support for peptide therapy: BPC – 157, sermorelin, ipamorelin, CJC -1295, semaglutide, and Thymosin alpha-1.

Downsides of Peptide therapy

For healthy individuals, peptide supplements are unlikely to cause serious side effects because they are similar to the peptides present in everyday foods.

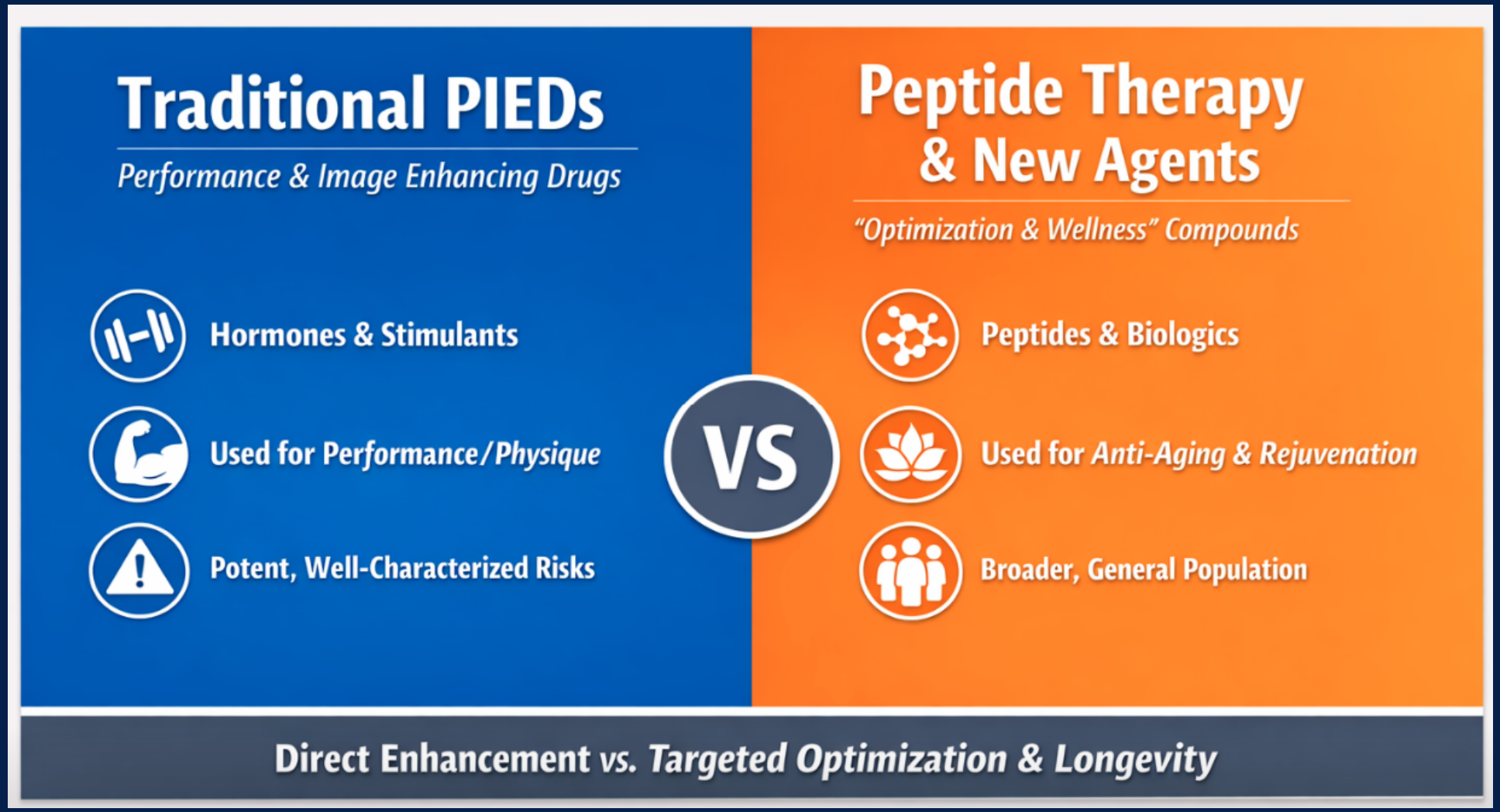
A vs B





Trenbolone, HCG and testosterone in ampoules on left (IM –glute or thigh injection)

Old* vs the New**



Mostly only athletes use steroids, right???

Nope…

- Mostly middle-class males who are either non-competitive body builders and are not current or former athletes (*www.Reuters.com* & *Yesalis CE., et al*).
- Although the mean age for steroid users in the US is 18 years, more than half of lifetime steroid users >26 years (*Cohen J., et al*).
- Another study showed typical user was a white male around the age of 30 who was educated, earned an above-average income, and was not particularly athletic, and most men misused steroids to look better (Cohen J., et al)

http://www.reuters.com/article/us-steroid-users-idUSCOL17558920071121
Yesalis CE, Kennedy NJ, Kopstein AN, Bahrke MS. Anabolic-Androgenic Steroid Use in the United States. JAMA. 1993;270(10):1217–1221. doi:10.1001/jama.1993.03510100067034

Case 2: JT

- 32-year-old male competitive amateur bodybuilder presents to urgent care primarily for anhedonia, but also palpitations, diaphoresis, tremor, and severe anxiety.

- He reports a 6-week history of progressively worsening restlessness, insomnia, heat intolerance, and unintentional weight loss of 12 lbs. despite maintaining a high-calorie diet.

- Over the past 48 hours, he developed severe anxiety, emotional lability, and an inability to experience pleasure (anhedonia), which prompted presentation.

Case 2: JT

- He admits to escalating use of performance-enhancing substances over the past year in preparation for competitions. Specifically:
  - Thyroid hormone (liothyronine/T3): self-administered at supratherapeutic doses (up to 100 mcg daily) for fat loss
  - Anabolic-androgenic steroids (AAS): including testosterone enanthate, trenbolone, and oral oxandrolone in stacked cycles
  - Human growth hormone (HGH): daily use (4–6 IU/day) for “recomposition”

- He reports increasing preoccupation with body fat percentage and muscular definition, stating he “still looks small and soft” despite objectively large muscular size.

Case 2 -JT

Panelists:

- What are some of the main issues JT is experiencing?
- What needs to be addressed most quickly?
- Briefly discuss some of the longitudinal issues that need to be addressed (if he is willing)…

Traditional vs Next Generation PIEDs

- Traditional PIEDs are blunt, high-impact hormonal or stimulant tools used to enhance strength (anabolic steroids) or improve speed or endurance (stimulants or erythropoietin)

- Newer ‘peptides’ and associated agents are marketed as targeted, “precision” biologics for ‘optimization’ – often with less evidence and much more regulatory ambiguity.

Diversity in PIED Use

- Expanding beyond athletes: fitness, wellness, anti-aging populations; women and non-athletes underrecognized
- Gender & cultural influences: body ideals (muscularity vs thinness), cultural norms shape use
- Psychosocial drivers: body image, perfectionism, performance pressure, social media
- PIED use spans diverse populations—not a single “athlete” profile
- Cost and access to providers or resources that can obtain PIEDs limited via socioeconomic factors

Audience Poll

- In what context are addiction providers encountering newer (e.g., Peptide Therapy) PIED use?
  - A.) clinical/Rx/monitored use,
  - B.) self-taught* research chemical source often (unless $$$) for use in sports or body building (or for use in aesthetics and rejuvenation (feel 40 when 55).
  - D.) Aesthetics/’beauty’
  - E.) More than one of the above

Panelist Questions:

- Can use of PIEDs be a healthy way to feel better as one ages (testosterone, tesamorelin, tadalafil [or PT-141 if appropriate]) APPROPRIATE LAB MONITORING***

- Panelists –how often do you see this happening? Or if you see it is it selection bias? ***Better question how often do you feel people are using PIEDs and improving health vs consequences?***

Case 3

- A late 40s-year-old male former rugby player with a history of opioid use disorder is prescribed testosterone after careful lab testing showed he had extremely low levels
  - > 10 years with IVDU heroin, oxycodone IR (insufflated) and now buprenorphine.
- He liked the way he felt on testosterone: his libido returned, and his significant other was also pleased.
- They'd been together for > 25 years and she was starting to have perimenopausal symptoms.
  - He encouraged her to look into an online women's health clinic (after PCP, Gyn and a local women's health clinic essentially did hormone tests but very minimal follow-up with limited explanation).
  - She also struggled with OUD but was able to stop during her first pregnancy through self taper of illicit buprenorphine and small amount of methadone.

Case 3

- In addition to the testosterone (both Rx and supplemented) the male has been using BPC-157, ipamorelin and “a few different SARMs” (mainly testolone/RAD 140).
  - He reports needing clomiphene citrate, tadalafil or sildenafil (“but PT-141 works the best in that area”).
- He reports he was briefly able to obtain Growth Hormone, but it was extremely expensive (up to $500.00 for 12 vials of 10 units with 2-4 days each of use of 2.5-5 units SC at night).
- So he reports switching to ipamorelin, but has tried “hexarelin, tesamorelin and sermorelin… less expensive but not cheap.”

Panelists

Comment on these PIEDs ---vs

- BPC-157
- Hexarelin
- Tesamorelin
- Sermorelin
- Ipamorelin

These compounds

- Sildenafil
- Tadalafil
- PT-141
- Clomiphene citrate or tamoxifen
- HCG (human chorionic gonadotropin)
- Anastrazole
- Finasteride

GHRH and GHRP

- **Hexarelin** –synthetic growth hormone-releasing peptide (GHRP)
- **Tesamorelin** –A synthetic growth hormone releasing (GHRH) analog approved to treat HIV associated lipodystrophy
- **Sermorelin** -a Synthetic GHRH analog (shorter fragment) used historically for GH deficiency and now as an anti-aging therapy (often with other hormones or peptides (e.g., mens health/women's health or “rejuvenation clinics)

Tesamorelin is an FDA-approved SC injection given daily at 1 mg for five days, then 2 days off.

BUT: 3 months on, 2 months off is used to avoid pituitary somatotroph downregulation over time

SUMMARY – GHRH/GHRP:

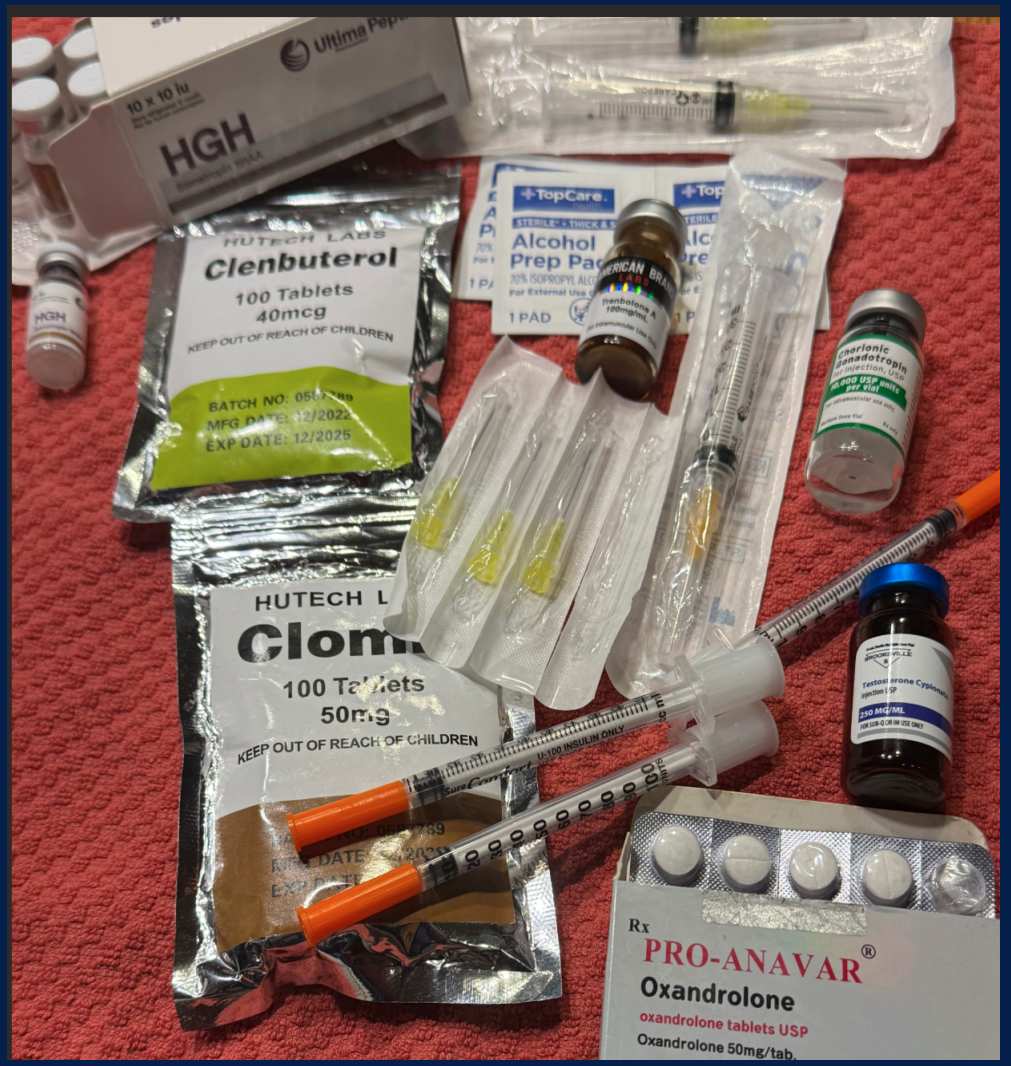
Hexarelin is an experimental peptide a strong GH stimulator via ghrelin receptor (not approved) it is ghrelin mimetic

Tesamorelin is FDA approved GHRH analog for reducing visceral fat in HIV patients (lipodystrophy) that also has a reliable IGF-1 boost. Stimulates GHRH on pituitary somatotrophs → ↑Growth Hormone

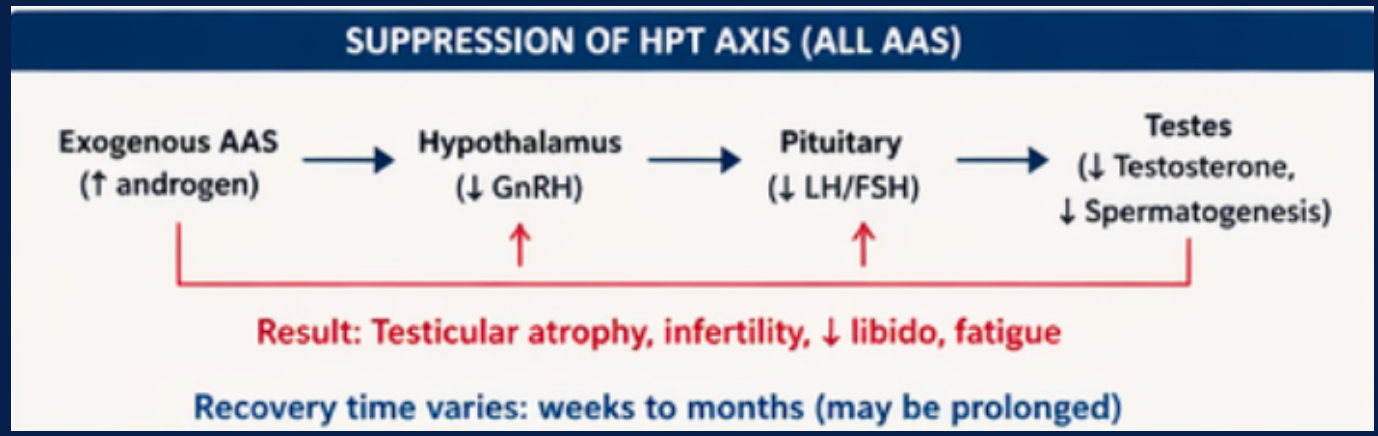
Sermorelin –older, weaker GHRH analog previously used diagnostically and in off-label antiaging settings

PCT (Post-Cycle Therapy) and other agents (*there are many but less common or emerging…)*

- Clomiphene or tamoxifen (SERMs)
- Clenbuterol
- PDEs, PT-141 (bremelanotide)
  - Sildenafil, tadalafil
- Human Chorionic Gonadotropin (HCG)



The sexual performance agents…



- Tadalafil
- Sildenafil
- Novel sexual response peptides
  - PT-141 (bremelanotide)–melanocortin agonist that induces sexual arousal and erections via brain and spinal mechanisms in dose-dependent manner *independent of stimuli*.
  - Melanotan-2*

Molinoff PB, Shadiack AM, Earle D, Diamond LE, Quon CY. PT-141: a melanocortin agonist for the treatment of sexual dysfunction. Ann NY Acad Sci. 2003 Jun; 994:96-102. PMID: 12851303

Our prior couple (late 40's) what type of laboratory evaluation/monitoring ?

- A male and his wife present to you for evaluation complaining of mood swings and irritability since going "full in" on weight loss and exercise and "to look and feel young again." The male has sexual dysfunction (without meds ED at times) and female intermittent low libido (perimenopausal) male 48 F 50.

PANELISTS –*what is the 'big picture' here?*

Core panel (baseline for both)

- CBC (look for **polycythemia**)
- CMP (hepatic + renal)
- Fasting lipid panel (**HDL suppression, LDL elevation** common)
- A1c + fasting glucose
- TSH, free T4
- Prolactin
- Morning cortisol (if concern for suppression from GH/peptides)

Management Plan → clarify goals harm reduction vs cessation

- **If they are NOT ready to stop**
- Educate:
  - Cardiovascular risk (most important)
  - Psychiatric effects
- Reduce:
  - Stacking multiple anabolic agents simultaneously
  - Clenbuterol (high risk for arrhythmia)
  - Trenbolone (high neuropsychiatric toxicity)

Male:

- Stop AAS
- Consider **post-cycle therapy (PCT)**:
  - Clomiphene or enclomiphene
  - +/- HCG (short term)
- Monitor recovery of LH/FSH/testosterone

Female:

- Stop *androgenic* agents (oxandrolone, RAD-140)
- Continue appropriate menopausal HRT if indicated
- Monitor for:
  - Persistent virilization (may not fully reverse)

Symptom Management

Libido

- Don’t escalate PDE-5/PT-141 use → treat underlying axis issue

Mood / irritability

- Screen for:
  - AAS-induced mood disorder
  - Hypomania/depression
- Consider:
  - SSRI/SNRI cautiously
  - Behavioral therapy

Cardiovascular risk mitigation

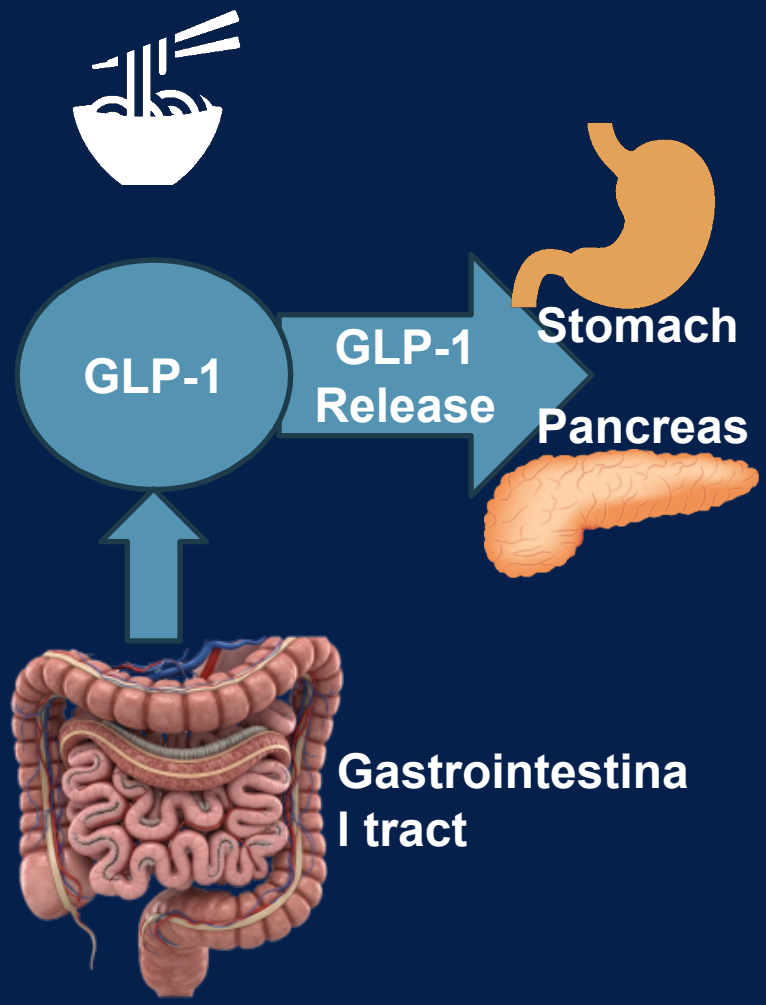
- Screen for abnormal lipid panel (low HDL, high LDL)
- Statin –if dyslipidemia persists
- Treat hypertension aggressively
- Consider coronary calcium scoring (if long term use)

What type of medical comorbidities might be seen in these patients?

- Cardiovascular
  - Dyslipidemia, hypotension, LV hypertrophy and dysrhythmia if agents like clenbuterol used
- Hepatic (DILI)
  - Transaminitis, cholestasis of oral AAS used
- Endocrine
  - Secondary hypogonadism, insulin resistance, infertility (if younger)
- Psychiatric
  - Anxiety, body dysmorphia, irritability/aggression, depression
- Sexual
  - Paradoxical erectile dysfunction (despite high doses of androgens), decreased libido –neuroendocrine dysfunction
- Dermatologic
  - Acne, alopecia
- Female specific
  - Virilization (voice deepening, clitoromegaly) and menstrual cycle irregularities

Glucagon-Like Peptide-1 (GLP-1)

- Short-acting peptide with 30 amino acids
- Produced in the intestinal mucosa and pancreas
- Regulates blood glucose and food intake



Inhibit gastric emptying

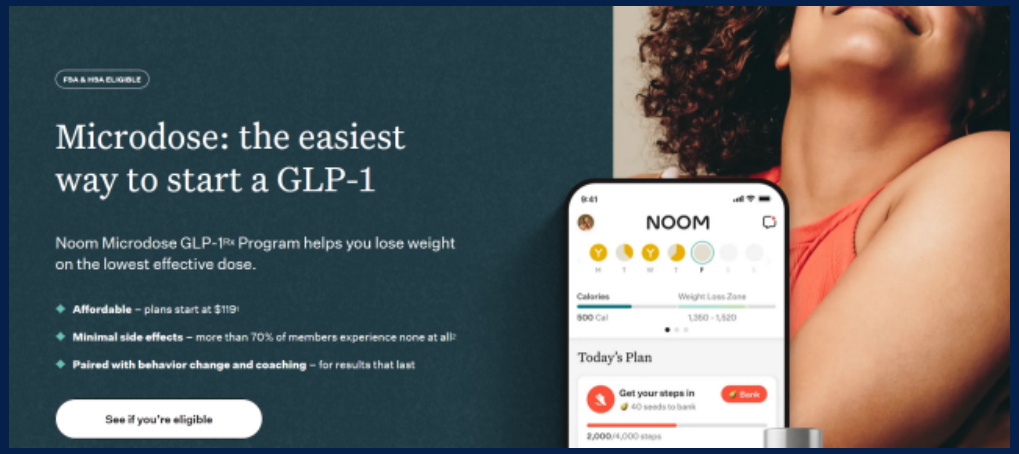
↓ Blood glucose

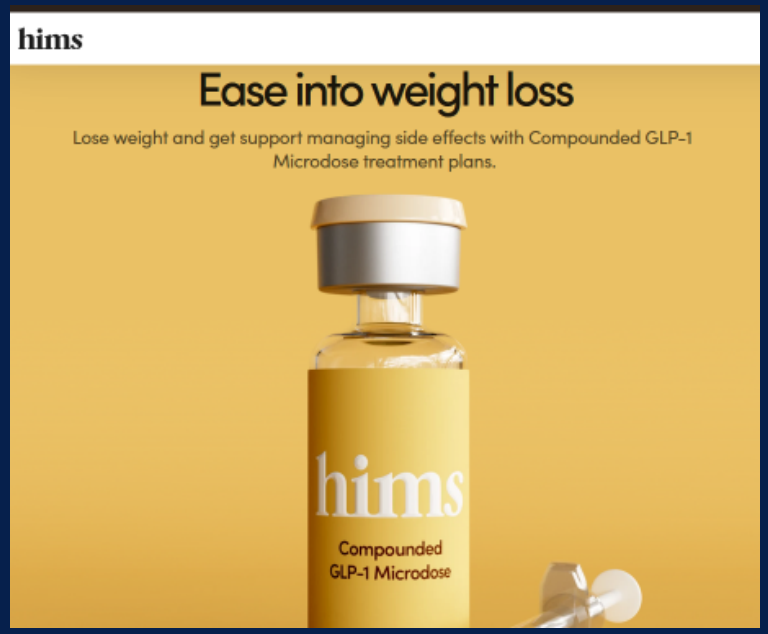
↓ Glucagon secretion

↑ Insulin release

Adapted from Cohen ND, et al. *The Medical journal of Australia*, 2013; *199*(4), 246–249.
Illustration courtesy of: https://easy-peasy.ai/ai-image-generator/images/3d-human-small-intestine-white-background
Illustration courtesy of: https://www.needpix.com/photo/1195842/pancreas-organ-anatomy-free-pictures-free-photos-free-images-royalty-free-free-illustrations

Rapidly emerging “micro-dosing” market for GLP-1RAs without any empirical support for their efficacy





Forbes HEALTH

Best GLP1 For Microdosing Of 2026

Below are several of the most popular telehealth platforms for obtaining prescription weight loss medications online. Choose the best fit for your goals and lifestyle.

We earn a commission from the offers on this page, which influences which offers are displayed and how and where the offers appear. Advertiser Disclosure.

Most Popular

1 NOOM

Noom

- GLP-1s starting at $99 - no insurance required
- Microdose & Wegovy pill now available
- 100% online prescriptions with fast & free shipping

9.8 EXCELLENT

Visit Site →

Go to Noom

People's Choice

2 ro

Ro

- Access to the Wegovy pill (first and only FDA-approved GLP-1 weight loss pill), if prescribed
- Access to the fastest working GLP-1 for half the list price
- Get started online for just $45

9.8 EXCELLENT

Visit Site →

Go to Ro

Adapted from Joji Suzuki

“Get *yer* semaglutide, tirzepatide, here…”

Variety of options for GLP-1 agonists … and →

See Peptide Therapy for Weight Loss ›

Zepbound (Tirzepatide) - 1…

$75.00

LifeMD

Compound Semaglutide…

$200.00

Liferx md

Sermorelin Injection | Growt…

$99.00

Ageless Rx

1.9K+ viewed

Wegovy (Semaglutide) - 1…

$75.00

LifeMD

13.4K+ viewed

Zepbound Vial (Tirzepatide) - 1…

$299.00

LifeMD

Ozempic (Semaglutide) - 1…

$75.00

LifeMD

4.8K+ viewed

Mounjaro (Tirzepatide) - 1…

$75.00

LifeMD

6.7K+ viewed

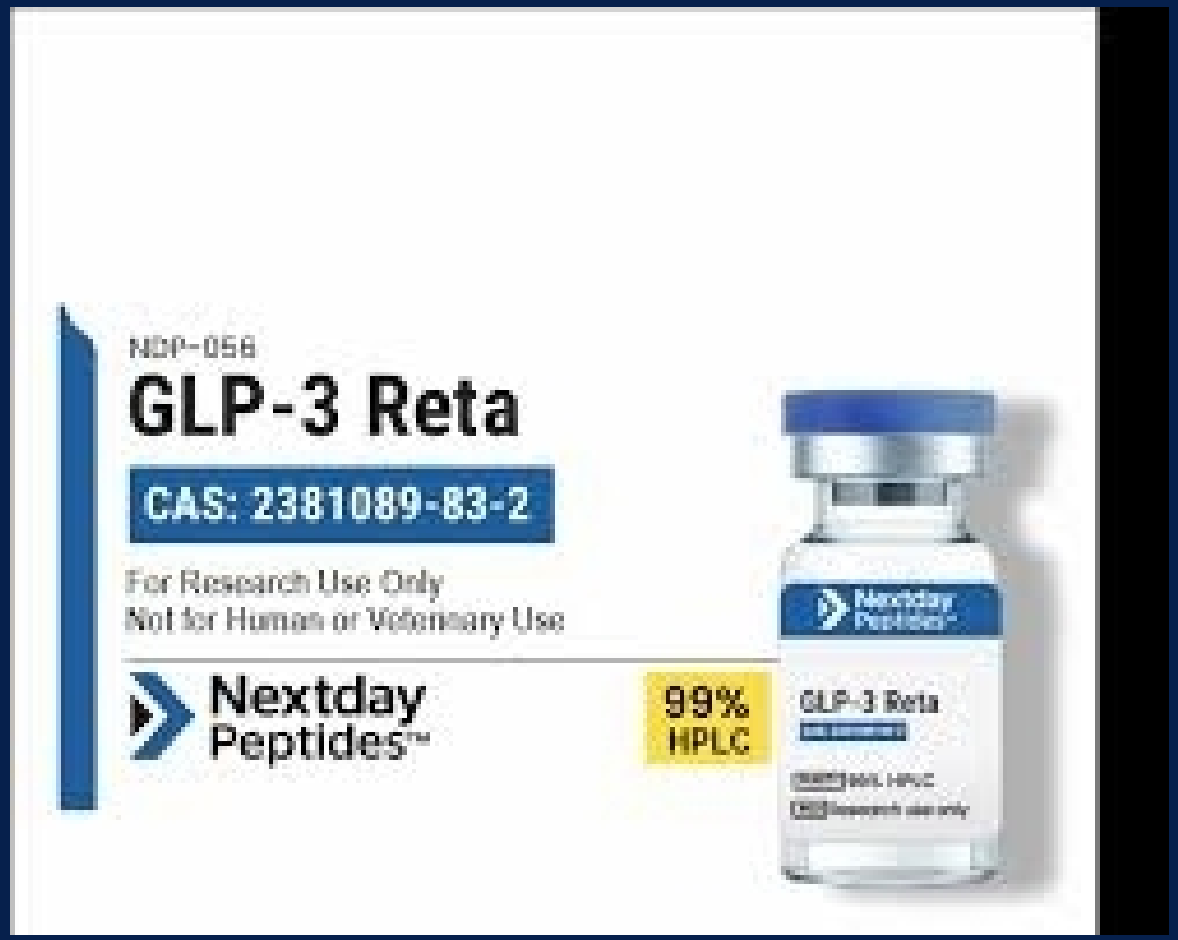
GLP-1 Injection - Ro Weight Loss…

$45.00

Ro Body

780+ viewed

And before FDA approval…



- Retatrutide (Ly3437943): investigational once-weekly injectable “triple agonist” (GLP-1, GIP, and glucagon receptors)
- Being developed by Eli Lilly for obesity and type 2 diabetes.
- Phase 2-3 trials show weight loss ranging from 24-28% over 48-68 weeks (more than currently approved GLP-1RAs).

Jastreboff, AM,. Et al., Triple-Hormone-Receptor Agonist Retatrutide for Obesity – A Phase 2 Trial. N Engl J Med 2023; 289: 514-526.

Case 5

- A Medical Professional has been taking semaglutide for several months for weight loss.
  - She notes some profound effects on her health
  - However, her physician tells her that she no longer qualifies for insurance coverage for this medication.

- Her family feel she's lost too much weight, but she is adamant about continuing, stating, "what about cutting the dose in ¼ or microdosing –how does that work?"

A few important comments…

- The most important thing on the patient's mind may not be the questions they ask –"you can help with that????!!!" (or are willing to help with that).

- Why are our (*most treat SUD patients not PIED use*) patients at risk? We are focusing on limited areas the neuroendocrine dysfunction from drugs/stress (not just opioids but antipsychotics, others) can be substantial.

- "My PCP told me to get a sleep study, exercise, work on diet and we would recheck labs in 6 months." *Sleep study avg time 10 months in Rochester, NY with standard 'good' insurance!*
  - "Am I ever going to have sex again?"
  - "No f**ing way am I taking those antidepressants they mess up my ability to get hard." --countering misinformation critical! *Already enough stigma and bias around medical and mental health treatment in males particularly!~*

What do people think about these ‘new’ peptides?

What do providers think about these ‘new’ peptides?

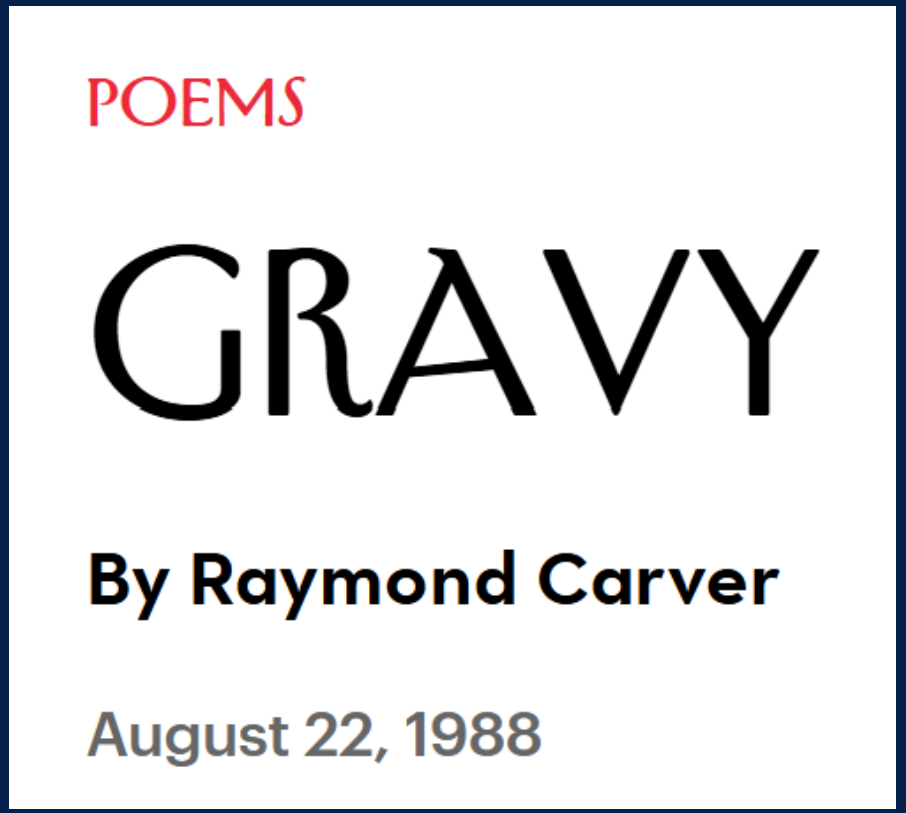
https://talksport.com/sport/3225320/james-magnusson-body-transformation-peds-1m-world-record-attempt/?utm_source=chatgpt.com

What are the “Enhanced Games”?

- Enhanced games is a competition that explicitly allows PEDs, some athletes openly claim use of combinations of testosterone, peptides (CJC-1295, ipamorelin and BPC-157 common)

- An article by James Magnussen (former Olympic swimmer) claimed PED use (peptides and testosterone) helped with body transformation (image enhancement and overall wellness enhanced-claims)

Final thought…



No other word will do. For that's what it was. Gravy.
Gravy these past ten years.
Alive, sober, working, loving and
being loved by a good woman. Eleven years
ago he was told he had six months to live
at the rate he was going. And he was going
nowhere but down. So he changed his ways
somehow. He quit drinking! And the rest?
After that it was *all* gravy, every minute
of it, up to and including when he was told about,
well, some things that were breaking down and
building up inside his head. "Don't weep for me,"
he said to his friends. "I'm a lucky man.
I've had ten years longer than I or anyone
expected. Pure gravy. And don't forget it."

References

1. Vasireddi N, Hahamyan HA, Gould HP, Gregory AJM, Gausden EB, Dodson CC, Voos JE, Calcei JG. Athlete Selective Androgen Receptor Modulators Abuse: A Systematic Review. Am J Sports Med. 2025 Mar;53(4):999-1009. doi: 10.1177/03635465241252435. Epub 2025 Jan 5. PMID: 39755947.
2. Leciejewska N, Jędrejko K, Gómez-Renaud VM, Manríquez-Núñez J, Muszyńska B, Pokrywka A. Selective androgen receptor modulator use and related adverse events including drug-induced liver injury: Analysis of suspected cases. Eur J Clin Pharmacol. 2024 Feb;80(2):185-202. doi: 10.1007/s00228-023-03592-3. Epub 2023 Dec 7. PMID: 38059982; PMCID: PMC10847181.
3. Nash E, Nicoll A, Batt N, George J, Perananthan V, Prince D, Wallace M, Gow P, Vaz K, Chitturi S, Flores JE, Braund A, Bonnichsen M, Riordan S, Humphris J, Duong T, McKenzie C, Liu K, Strasser SI. Drug-induced liver injury from selective androgen receptor modulators, anabolic-androgenic steroids and bodybuilding supplements in Australia. Aliment Pharmacol Ther. 2024 Apr;59(8):953-961. doi: 10.1111/apt.17906. Epub 2024 Feb 19. PMID: 38372012.
4. Van Wagoner RM, Eichner A, Bhasin S, Deuster PA, Eichner D. Chemical Composition and Labeling of Substances Marketed as Selective Androgen Receptor Modulators and Sold via the Internet. JAMA. 2017;318(20):2004–2010. doi:10.1001/jama.2017.17069
5. Bond P, Smit DL, Verdegaal T, de Ronde W. Selective androgen receptor modulators: a critical appraisal. Front Endocrinol (Lausanne). 2025 Sep 26;16:1634799. doi: 10.3389/fendo.2025.1634799. PMID: 41079187; PMCID: PMC12510846.
6. http://www.reuters.com/article/us-steroid-users-idUSCOL17558920071121
7. Cohen J, Collins R, Darkes J, Gwartney D (October 2007). "A league of their own: demographics, motivations and patterns of use of 1,955 male adult non-medical anabolic steroid users in the United States". *Journal of the International Society of Sports Nutrition*
8. Havnes IA, Jørstad ML, McVeigh J, Van Hout MC, Bjørnebekk A. The Anabolic Androgenic Steroid Treatment Gap: A National Study of Substance Use Disorder Treatment. Subst Abuse. 2020 Feb 18;14:1178221820904150. doi: 10.1177/1178221820904150. PMID: 32127749.

Additional References

- https://bestpractice.bmj.com/topics/en-us/987?utm
- Molinoff PB, Shadiack AM, Earle D, Diamond LE, Quon CY. PT-141: a melanocortin agonist for the treatment of sexual dysfunction. Ann NY Acad Sci. 2003 Jun; 994:96-102. PMID: 12851303
- Çınaroğlu M, Yılmazer E. Muscle Dysmorphia, Obsessive-Compulsive Traits, and Anabolic Steroid Use: A Systematic Review and Meta-Analysis. Behav Sci (Basel). 2025 Sep 4;15(9):1206. doi: 10.3390/bs15091206. PMID: 41009236; PMCID: PMC12466485.

- *Many other references inserted throughout individual slides…*