LVL UP RX · CLIENT EDUCATION SERIES

Melanotan II

MT-2 · Alpha-MSH Analog · Melanocortin Peptide

Tanning · Libido · Appetite Suppression · UV Protection

A complete research guide to Melanotan II — the melanocortin peptide that activates your body's own tanning system, enhances libido, and suppresses appetite through three simultaneous receptor pathways.

FOR RESEARCH PURPOSES ONLY

LVL UP RX

Client Education Series

Everything you need to know about Melanotan II and the melanocortin system

> *Most tanning methods work by causing UV damage to your skin — melanin is produced as a stress response. MT-2 works differently: it directly activates the melanocortin receptors that control melanin production, triggering a deeper, more even tan while actually increasing your skin's ability to protect itself from UV radiation.*

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Alpha-MSH Analog — Melanocortin Peptide

What Is Melanotan II?

A synthetic analog of alpha-MSH — your body's own tanning hormone

Melanotan II (MT-2) is a synthetic cyclic heptapeptide — a modified analog of alpha-melanocyte-stimulating hormone (alpha-MSH), a naturally occurring melanocortin peptide produced in the pituitary gland. It was developed in the 1980s and 1990s at the University of Arizona, originally as part of a research program seeking a way to reduce skin cancer risk by promoting tanning without UV exposure.

Alpha-MSH is the body's primary melanin-stimulating signal — it binds to melanocortin receptors on melanocytes (the skin cells that produce melanin) and triggers melanin synthesis. MT-2 was engineered as a more potent, more stable, and more bioavailable version of this natural signal. Where natural alpha-MSH has a very short half-life, MT-2 is designed to resist enzymatic breakdown and produce sustained receptor activation.

MT-2 turned out to be a multi-receptor compound — it activates not only MC1R (the tanning receptor) but also MC3R (appetite and energy regulation) and MC4R (sexual arousal and libido). This broad melanocortin receptor activity is the basis of its three primary research effects: enhanced skin pigmentation, libido enhancement, and appetite suppression.

7aa	1980s	3	SubQ
AMINO ACIDS	**DEVELOPED**	**RECEPTORS**	**DELIVERY**
cyclic peptide	Univ. of Arizona	MC1R·MC3R·MC4R	injection protocol

The Natural Alpha-MSH Connection

Alpha-MSH is released from the pituitary in response to UV radiation. When UV rays hit the skin, keratinocytes release signals that stimulate pituitary alpha-MSH production, which then travels to melanocytes to increase melanin output — a delayed response that explains why a tan appears 24–48 hours after sun exposure. MT-2 bypasses this indirect pathway, directly stimulating melanocortin receptors to produce melanin without requiring UV damage to initiate the process.

MT-2 was developed before its sister compound Melanotan I (afamelanotide/Scenesse), which is now an FDA-approved treatment for erythropoietic protoporphyria. The two compounds share the same core mechanism but MT-2's cyclic structure gives it broader receptor activity and a different side effect and efficacy profile.

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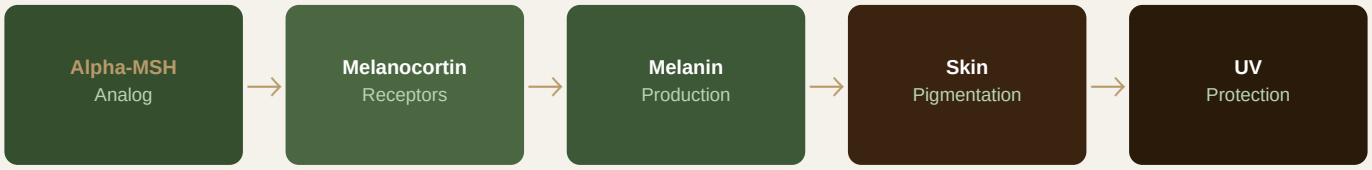
THE MELANOCORTIN SYSTEM

Three Receptors — Three Effects

The Melanocortin System

Understanding MT-2's three simultaneous receptor pathways

The melanocortin system is a family of G protein-coupled receptors (GPCRs) distributed throughout the body. There are five melanocortin receptors (MC1R–MC5R), each expressed in different tissues and responsible for different biological effects. MT-2 has significant activity at three of them:



MC1R
Melanocytes
- Melanin synthesis
- Skin pigmentation
- UV protection

MC3R
Hypothalamus
- Appetite regulation
- Energy balance
- Metabolic effects

MC4R
Brain/CNS
- Libido enhancement
- Erectile function
- Sexual arousal

MC1R — The Tanning Receptor

Located on melanocytes — the skin cells that produce melanin. MC1R activation triggers the upregulation of tyrosinase, the key enzyme in the melanin biosynthesis pathway. This increases the production of eumelanin — the brown/black form of melanin that provides the visible tan color and UV-absorbing photoprotection. MC1R activation also shifts the melanin production ratio from pheomelanin (red/yellow, less protective) to eumelanin (brown/black, more protective) — meaning MT-2 produces not just a tan, but a more UV-protective tan.

MC3R — The Appetite & Energy Receptor

Located in the hypothalamus and peripheral tissues. MC3R activation plays a role in energy homeostasis, appetite regulation, and metabolic efficiency. MC3R agonism contributes to MT-2's appetite-suppressing effects and may contribute to its reported influence on energy expenditure. This receptor pathway makes MT-2 of interest in metabolic and body composition research beyond its tanning applications.

MC4R — The Sexual Function Receptor

Located primarily in the brain and spinal cord. MC4R activation is the mechanism behind MT-2's libido-enhancing and pro-erectile effects. The MC4R pathway is a well-established regulator of sexual arousal in both males and females — it is involved in the initiation of erectile response, genital engorgement, and sexual motivation. MC4R agonism is also the mechanism behind the development of PT-141 (bremelanotide), an FDA-approved drug for hypoactive sexual desire disorder in women, which was directly derived from MT-2 research.

The Melanocortin System

MC1R · MC3R · MC4R Explained

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THE SCIENCE

How MT-2 Works at the Cellular Level

The Science Behind MT-2

Melanin synthesis, sexual pathway activation & appetite regulation

Melanin Synthesis — The Tanning Pathway

When MT-2 binds to MC1R on melanocytes, it activates adenylate cyclase through Gs protein coupling, increasing intracellular cAMP levels. Elevated cAMP activates protein kinase A (PKA), which phosphorylates CREB (cAMP response element-binding protein). CREB then upregulates the transcription of MITF (microphthalmia-associated transcription factor) — the master regulator of melanocyte function. MITF in turn drives the expression of tyrosinase and related enzymes that catalyze melanin production. The result is increased synthesis and transfer of melanosomes (melanin-containing organelles) to surrounding keratinocytes, producing the visible darkening of the skin.

Critically, MT-2 biases melanin production toward eumelanin — the dark brown/black form — rather than pheomelanin (the red/blonde form). Eumelanin is significantly more effective at absorbing UV radiation, meaning MT-2 produces a tan that offers superior photoprotection compared to both UV-induced tanning and pheomelanin-dominant skin types.

Sexual Function — The MC4R Pathway

MT-2's pro-erectile and libido-enhancing effects are mediated through MC4R in the brain and spinal cord. MC4R activation in the paraventricular nucleus of the hypothalamus triggers oxytocin release and activates downstream pathways that increase genital blood flow and sexual arousal. In males, this produces pro-erectile effects — including the spontaneous erections commonly reported during the loading phase. In females, MC4R activation produces increased genital arousal and sexual motivation. These effects are the direct basis of the PT-141 (bremelanotide) pharmaceutical, approved by the FDA in 2019 for hypoactive sexual desire disorder.

Appetite Suppression — The MC3R/MC4R Pathway

Both MC3R and MC4R play roles in hypothalamic appetite regulation. The melanocortin system in the arcuate nucleus of the hypothalamus is a central regulator of food intake and energy balance — MC4R agonism in this region reduces appetite and food intake. MT-2's appetite-suppressing effects are a consistent secondary finding across research subjects, making it of ancillary interest in body composition and weight management research contexts.

Melanotan II

The Science — Mechanism of Action

MT

MT-2

Melanotan II · Alpha-MSH Analog

Tanning · Libido · Appetite Suppression · Melanocortin System

Key Benefits of Melanotan II

Research-supported effects across tanning, libido & metabolism

Skin Tanning & UV Protection

- Produces deep, natural-looking melanin-based tan — particularly pronounced in naturally fair-skinned individuals
- Tanning effect visible within 1–2 weeks of loading protocol, even without significant sun exposure
- Shifts melanin production toward eumelanin — the more UV-protective pigment form
- Enhanced tan deepens significantly with sun exposure compared to unassisted UV tanning
- Tan persists longer than UV-induced tanning — maintained for weeks after discontinuation
- Studied as a potential photoprotective strategy for fair-skinned, UV-sensitive individuals
- Originally developed specifically to reduce skin cancer risk in fair-skinned populations

Libido & Sexual Function

- Enhanced libido and sexual desire documented consistently in research subjects of both sexes
- Pro-erectile effects in males through MC4R activation — often pronounced during loading phase
- Increased genital arousal and sexual motivation in females through the same MC4R mechanism
- PT-141 (bremelanotide) — an FDA-approved drug for female hypoactive sexual desire — is directly derived from MT-2 research
- Effects on sexual function are typically among the first effects noticed — often within the first week of use
- Libido effects persist beyond individual dosing and may accumulate with sustained use

Appetite Suppression & Body Composition

- Reduction in appetite and caloric intake commonly reported — useful adjunct to body composition goals
- Appetite suppression through MC3R/MC4R hypothalamic signaling
- May complement fat loss protocols by reducing hunger without stimulant mechanisms
- Weight loss is a secondary effect — MT-2 is not a primary fat-loss compound but can support caloric reduction

BENEFIT	RECEPTOR	ONSET	RESEARCH STATUS
Skin tanning	MC1R — melanocytes	1–2 weeks (loading)	University research + clinical
UV protection	MC1R — eumelanin shift	Concurrent with tan	Mechanistically established
Libido (male)	MC4R — hypothalamus	Days–1 week	Consistent research findings
Libido (female)	MC4R — hypothalamus	Days–1 week	PT-141 derived from MT-2
Appetite suppress.	MC3R/MC4R — arcuate	Days–2 weeks	Consistent secondary effect

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WHO IS IT FOR?

Ideal Candidates & Use Cases

Who Is Melanotan II For?

Ideal research candidates and use cases

Fair-Skinned Tanning Enthusiasts

Individuals with Fitzpatrick skin types I–III (very fair to medium skin) who tan poorly, burn easily, or want to achieve a deeper tan more efficiently. MT-2 is particularly effective in these skin types — the shift from pheomelanin to eumelanin production produces visible results even in individuals who historically struggle to tan with sun exposure alone.

Sun Protection & UV Sensitivity

Individuals with heightened UV sensitivity who want to increase their skin's protective melanin content before significant sun exposure. MT-2's mechanism of eumelanin promotion increases the skin's natural SPF — relevant for those with photosensitivity concerns or working or living in high UV environments.

Libido Enhancement — Male

Men experiencing reduced libido, erectile dysfunction, or diminished sexual interest who want a research-based intervention that addresses the problem through the CNS sexual arousal pathway (MC4R) rather than through vascular mechanisms alone.

Libido Enhancement — Female

Women experiencing hypoactive sexual desire or reduced sexual arousal. The FDA approval of PT-141 for female sexual dysfunction validates the MC4R pathway as a legitimate target for female libido enhancement. MT-2, as the precursor compound to PT-141, acts through the same mechanism.

Body Composition Support

Those in caloric deficit phases who find hunger management challenging. MT-2's appetite-suppressing secondary effects can provide meaningful caloric intake reduction without stimulant mechanisms — relevant when stacked with Retatrutide or other fat-loss protocols.

Aesthetic & Lifestyle Research

Active individuals, fitness consumers, and those in image-focused professions who want the aesthetic outcome of a deep, lasting tan without repeated UV exposure.

Protocols & Delivery

How MT-2 is administered in research contexts

MT-2 is administered via subcutaneous (SubQ) injection using a standard insulin syringe. Unlike some peptides where timing is critical, MT-2 administration timing is relatively flexible — though evening administration is often preferred to allow side effects (nausea, flushing) to pass during sleep.

The Two-Phase Protocol

MT-2 research protocols typically follow a two-phase structure — a loading phase to build melanin and establish the tan, followed by a lower-dose maintenance phase to sustain it:

- Loading Phase: More frequent administration over 2–4 weeks to build melanin levels — start LOW and titrate up slowly to minimize side effects
- Maintenance Phase: Reduced frequency to sustain established tan with minimal additional dosing
- Sun exposure during the loading phase dramatically accelerates results — even brief daily sun exposure significantly amplifies the tanning effect
- The tan produced is cumulative — each dose and each sun exposure builds on the previous

PHASE	FREQUENCY	DURATION	SUN EXPOSURE	NOTES
Loading	Daily or every other day	2–4 weeks	Recommended: 15–30 min daily	Start at lowest dose; titrate slowly
Maintenance	2–3x per week	Ongoing	As desired	Once tan established; lower dose often sufficient
Off Cycle	None	4–8 weeks	Normal	Tan fades gradually; restart loading to refresh

Reconstitution: Add bacteriostatic water slowly to lyophilized powder. Swirl gently — do not shake. Refrigerate after reconstitution. Use within 30–60 days. Never freeze reconstituted MT-2. Protect from light — melanocortin peptides are light-sensitive.

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THE LOADING PROTOCOL

Why Slow Titration Is Essential

The Loading Protocol

The most important protocol element for MT-2 research

Titration is the single most critical factor in MT-2 research tolerance. The most common side effects — nausea, facial flushing, and spontaneous erections (males) — are all dose-dependent and dramatically reduced by starting at a very low dose and increasing slowly. Many adverse experiences with MT-2 result from starting at too high a dose.

Why Nausea Occurs

Nausea is the most commonly reported MT-2 side effect and is caused by MC3R and MC4R activation in the brainstem's area postrema — a chemoreceptor trigger zone with no blood-brain barrier. This nausea is dose-dependent and typically resolves within 1–2 hours. It is most pronounced during the first few administrations and significantly diminishes as the body adapts over 1–2 weeks of consistent use.

The Titration Approach

- Begin at the absolute lowest available dose — the goal is to identify your personal tolerance threshold
- Administer in the evening so nausea and flushing occur during sleep when possible
- Wait 48 hours between first doses to assess full response before increasing
- Increase dose only after tolerating the current dose without significant discomfort
- Do not rush the loading phase — slower titration produces better long-term tolerance
- Eating a small meal 30–60 minutes before administration reduces nausea for many research subjects
- If nausea is severe, reduce dose — do not discontinue; simply step back to a lower dose

SIDE EFFECT	CAUSE	MANAGEMENT	WHEN IT RESOLVES
Nausea	MC3R/MC4R brainstem	Start low; administer evening; eat before dosing	1–2 hrs; diminishes over 1–2 weeks
Facial flushing	Vasodilation via MCR	Normal; no action needed	30–60 minutes
Spontaneous erections (males)	MC4R activation	Expected; indicates activity	Resolves as dose becomes established
Fatigue/lethargy	Central MCR activity	Evening administration	Next morning
Darkened moles	MC1R melanocyte activation	Monitor; consult derm. if changing	Persists with use

IMPORTANT: Any existing moles or pigmented lesions may darken with MT-2 use. Research subjects with a history of atypical moles, dysplastic nevi, or personal/family history of melanoma should consult a dermatologist before use and monitor any changing lesions closely.

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STACKING MT-2

Synergistic Combinations for Complementary Outcomes

Stacking MT-2

Strategic combinations for enhanced outcomes

MT-2 stacks most naturally with compounds that address complementary goals — body composition, skin health, or sexual function.

— The Aesthetic Transformation Stack

MT-2 + Retatrutide

Retatrutide drives significant fat loss through triple receptor agonism. MT-2 adds a deep tan alongside the body recomposition process — the combination of reduced body fat and enhanced skin color produces maximally aesthetic body composition outcomes. MT-2's appetite suppression also complements Retatrutide's caloric reduction, creating a synergistic hunger management effect.

BEST FOR: *Body recomposition · Aesthetic goals · Fat loss + tan · Image-focused research*

— The Skin Health Stack

MT-2 + GHK-Cu

GHK-Cu stimulates collagen synthesis and activates over 4,000 genes related to tissue repair, skin quality, and anti-aging. MT-2 adds melanin production and UV protection. Together they represent a comprehensive skin optimization protocol — improved texture, elasticity, and collagen density (GHK-Cu) alongside enhanced pigmentation and photoprotection (MT-2). Often combined with microneedling for maximum dermal penetration.

BEST FOR: *Skin optimization · Anti-aging skin · UV protection · Aesthetic research*

— The Recovery & Skin Stack

MT-2 + BPC-157

BPC-157's systemic healing and anti-inflammatory properties complement MT-2 particularly for individuals combining tanning research with active training or physical recovery. BPC-157 supports gut comfort during the MT-2 adaptation period and provides systemic anti-inflammatory support that can reduce skin reactivity.

BEST FOR: *Active individuals · Recovery support · GI tolerance during loading*

— The Longevity Aesthetic Stack

MT-2 + NAD+

NAD+ supports cellular energy production and DNA repair — including the DNA repair mechanisms in skin cells that protect against UV-induced mutations. Combined with MT-2's UV-protective melanin enhancement, this stack addresses photoprotection from both the melanin barrier (MT-2) and the cellular repair machinery (NAD+) simultaneously.

BEST FOR: *UV protection · Skin longevity · Cellular health · Anti-aging*

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WHAT TO EXPECT

Timeline, Results & Side Effect Profile

What to Expect

A realistic, research-grounded timeline for MT-2

MT-2 effects develop progressively over the loading phase. Sexual function effects typically emerge first (within days), followed by appetite changes, with visible tanning results developing over 1–3 weeks depending on skin type and sun exposure.

TIMEFRAME	TANNING EFFECTS	LIBIDO/SEXUAL EFFECTS	APPETITE EFFECTS
Days 1–3	No visible change yet; melanocytes activating	Spontaneous erections (males) common; libido rising	Mild appetite reduction beginning
Days 4–7	Subtle skin darkening visible in fair skin; tan developing with sun	Strong libido enhancement; pro-erectile effects pronounced	Noticeable reduction in hunger/food interest
Week 2	Clear tan visible; deepening with sun exposure	Libido effects stabilizing at elevated baseline	Consistent appetite suppression established
Week 3–4	Deep, even tan established; maintenance phase begins	Sustained libido enhancement; more natural rhythm	Ongoing appetite reduction; supports caloric deficit
Maintenance	Tan maintained with 2–3x weekly dosing	Effects maintained with reduced frequency	Appetite effects maintained

SKIN TYPE MATTERS: *Results vary significantly by Fitzpatrick skin type. Types I–II (very fair, burns easily) will see the most dramatic transformation. Types III–IV will see meaningful enhancement. Types V–VI have less room for visible change as melanin is already high.*

Side Effect Profile

MT-2's side effects are well-characterized and primarily dose-dependent. The key is slow titration:

- Nausea: most common; dose-dependent; resolves within 1–2 hours; diminishes over first 1–2 weeks
- Facial flushing and warmth: common; typically 30–60 minutes; harmless; indicates compound activity
- Spontaneous erections (males): expected during loading phase; indicates MC4R activity; resolves as dose stabilizes
- Fatigue or mild lethargy: occasionally reported; evening administration reduces impact
- Darkening of moles and freckles: expected with melanocyte activation; monitor for changes
- Yawning and stretching: commonly reported; CNS melanocortin effect; not harmful
- Possible menstrual cycle changes: reported in some female research subjects; monitor
- No documented liver toxicity, hormonal disruption, or withdrawal syndrome

MT-2 should not be used by individuals with a personal or family history of melanoma, atypical moles, or dysplastic nevi without explicit dermatological supervision. Any mole or pigmented lesion that changes in size, shape, color, or sensation during MT-2 use should be evaluated by a dermatologist promptly.

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RESEARCH NOTES

Important Information & Compliance

Research Notes & Disclaimer

Please read carefully.

All products offered by LVL UP RX are sold strictly as research compounds for investigational use only. They are not intended for human consumption and are not approved by the FDA or any equivalent regulatory authority for therapeutic, preventive, or diagnostic use. MT-2 is an unapproved research compound — it is distinct from afamelanotide (Scenesse), which is FDA-approved for erythropoietic protoporphyria, and from bremelanotide (PT-141/Vyleesi), which is FDA-approved for female hypoactive sexual desire disorder.

The Research Landscape

Melanotan II has an extensive research history beginning at the University of Arizona in the 1980s–1990s. The melanocortin system it targets is well-characterized, and the downstream compounds derived from MT-2 research (afamelanotide, bremelanotide/PT-141) have both received FDA approval — validating the fundamental pharmacology. MT-2 itself remains an unapproved research compound with a well-documented but not formally regulated profile. This guide presents findings accurately and without exaggeration.

What We Will Never Claim

- That MT-2 treats, cures, or prevents any disease or medical condition
- That MT-2 is FDA approved or safe for human use as medicine
- That MT-2 is equivalent to or a substitute for prescription afamelanotide or bremelanotide
- That tanning results are guaranteed — skin type, baseline pigmentation, and sun exposure all influence outcomes
- That MT-2 is appropriate for individuals with melanoma risk without medical supervision

Selected Research References

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> *“Melanotan II is one of the most multifaceted research compounds in the melanocortin class — simultaneously addressing tanning, photoprotection, sexual function, and appetite through distinct but coordinated receptor pathways. At LVL UP RX, we provide both the compound and the education to understand it fully.*

LVL UP RX · PEPTIDES · SCIENCE-BACKED. RESULTS-DRIVEN.

For research use only. Not for human consumption. Consult a qualified healthcare professional.

Research Notes

Important Information & Compliance