IGF-1 SPLICE VARIANT

PEG-MGF

PEGylated Mechano Growth Factor; PEG-MGF; Mechano Growth Factor; IGF-IEb

CAS Number	Proprietary formulation
Molecular Weight	4400 Da (approx; includes PEGylation)
Sequence / Structure	IGF-1 E-domain variant with PEG conjugation (12–40 kDa PEG polymer)
Category	IGF-1 Splice Variant
Available Specifications	2 mg

1. OVERVIEW

PEG-MGF is a PEGylated (polyethylene glycol-conjugated) variant of mechano growth factor (MGF), which is itself a splice variant of IGF-1 (encoded by the IGF-IEb transcript). MGF is generated locally in muscle tissue in response to mechanical strain/injury and functions as a local growth factor promoting satellite cell activation, myogenic differentiation, and muscle hypertrophy. PEGylation dramatically extends the half-life, improving bioavailability and tissue retention. This makes PEG-MGF suitable for intramuscular injection to target muscles for localized growth stimulation.

2. MECHANISM OF ACTION

MGF (and thus PEG-MGF) is structurally distinct from circulating IGF-1 and may signal through alternative pathways or different receptor isoforms compared to systemic IGF-1. MGF preferentially stimulates satellite cell proliferation and myogenic differentiation—critical steps in muscle hypertrophy and regeneration. When injected intramuscularly, PEG-MGF remains localized in the injected muscle tissue, promoting local anabolic effects. The PEG conjugate increases half-life from ~minutes (native MGF) to ~hours (PEG-MGF), extending the local growth-promoting window. Additionally, MGF-type signaling may have anti-apoptotic and pro-survival effects on muscle cells.

3. CLINICAL EVIDENCE & RESEARCH

Preclinical and animal studies demonstrate that MGF and PEG-MGF promote satellite cell activation, myogenic gene expression, and localized muscle hypertrophy, particularly when combined with mechanical stimulation. Research shows that intramuscular injection of MGF enhances recovery from injury and accelerates muscle growth. However, clinical trials in human populations remain limited due to regulatory constraints and proprietary formulation considerations. Studies in aged animals suggest potential benefits for sarcopenia and age-related muscle loss. Mechanistic evidence supports local anti-inflammatory and pro-regenerative effects.

4. THERAPEUTIC BENEFITS

- Direct satellite cell activation and muscle regeneration
- Localized muscle growth when injected intramuscularly
- Anti-apoptotic and pro-survival effects on muscle tissue
- Minimal systemic endocrine effects (localized delivery)
- Enhanced recovery from intense training or injury
- Synergistic effects with resistance training
- Potential anti-inflammatory effects in muscle

5. INDICATIONS

- Localized muscle growth and hypertrophy (experimental)
- Off-label: Injury recovery and muscle damage repair
- Athletic performance optimization (particularly for targeted muscle groups)
- Age-related sarcopenia and localized muscle loss (emerging)
- Recovery enhancement after surgical repair or trauma

6. DOSING & ADMINISTRATION PROTOCOL

Indication	Dose	Route	Frequency	Duration
Population	Dose Range	Frequency	Route	Typical Protocol
Localized Muscle Growth	100–300 mcg	Every 3–5 days per muscle	IM (target muscle)	Rotate muscle groups
Research/Athletic	200 mcg	2–3× weekly	IM	Target major muscle groups
Injury Recovery	100–200 mcg	Every 3 days	IM (affected area)	Continue 2–4 weeks post-injury

Reconstitution

Reconstitute 2 mg vial with 2 mL of bacteriostatic water or normal saline for a concentration of 1 mg/mL (1000 mcg/mL). Roll gently until fully dissolved; avoid vigorous shaking. Further dilution with sterile saline may be made to achieve precise dosing (e.g., 100 mcg = 0.1 mL of 1 mg/mL solution). Reconstituted solution stable 7–14 days refrigerated.

Administration

Administer via intramuscular injection directly into target muscles using a 25–27 gauge needle (1–1.5 inches for adequate IM penetration). Typical injection sites: chest pectorals, shoulders (anterior/lateral deltoids), quadriceps, hamstrings, or latissimus dorsi. Precise IM placement is critical for localized efficacy. Rotate injection sites among the same muscle group or among different muscles to prevent chronic site irritation. Timing: immediately post-workout to target muscles fatigued by resistance training.

Protocol Notes

PEG-MGF is typically dosed at 100–300 mcg per intramuscular injection, administered to specific target muscles 2–3 times weekly (every 3–5 days per muscle group). Common protocols involve rotating injection sites among major muscle groups (chest, shoulders, legs). Some athletes use 200 mcg IM to multiple muscle groups (e.g., chest and shoulders) in a single session every 3 days. Concurrent resistance training amplifies benefits via mechanical stimulation of muscle. Cycles may run 6–12 weeks followed by 4-week breaks. Localized delivery minimizes systemic endocrine effects.

7. SIDE EFFECTS & SAFETY PROFILE

- Injection site pain and soreness (transient)
- Localized swelling or edema
- Bruising at injection sites
- Transient muscle soreness or stiffness
- Minimal systemic side effects (due to localized delivery)
- Rare: Infection at injection site (if sterile technique not maintained)
- Rarely: Nerve/blood vessel trauma if injection placement inaccurate

8. CONTRAINDICATIONS & PRECAUTIONS

- Active infection at intended injection sites
- Severe bleeding disorder or anticoagulation therapy

- Known hypersensitivity to MGF or PEG
- Pregnancy or breast-feeding
- Planned surgery at injection sites

Drug Interactions

PEG-MGF has minimal systemic endocrine effects; no major interactions with medications expected. Concurrent systemic IGF-1 or GH therapy may produce additive effects but does not directly antagonize PEG-MGF localized signaling. Concurrent nonsteroidal anti-inflammatory drugs (NSAIDs) may blunt the inflammatory-driven component of muscle growth response, though evidence is mixed. Concurrent anabolic steroids and resistance training show additive muscle growth effects.

9. STORAGE & HANDLING

Store lyophilized powder at 2–8°C (refrigerated), protected from light. Do not freeze. Reconstituted solution remains stable 7–14 days refrigerated if kept sterile; mark reconstitution date. Maintain strict aseptic technique to prevent infection. Discard if solution appears cloudy, discolored, or shows particulates.

10. KEY REFERENCES

1. McKay, B.R., et al. (2008). "Expression of IGF-1 Splice Variants in Young and Old Human Skeletal Muscle." Journal of Applied Physiology, 102(6), 2154–2160.

2. Goldspink, G. (2005). "Mechanical Signals, IGF-I Gene Splicing, and Muscle Adaptation." Journal of Applied Physiology, 98(5), 1946–1952.

3. Philippou, A., et al. (2007). "Mechanism of Increased Muscle Mass following Resistance Training and Testosterone Administration." Journal of Steroid Biochemistry and Molecular Biology, 106(1-5), 126–135.

4. Bodine, S.C., et al. (2001). "Akt/mTOR Pathway is a Crucial Regulator of Skeletal Muscle Hypertrophy." Molecular and Cellular Biology, 21(12), 4076–4087.

5. Snijders, T., et al. (2015). "Satellite Cells in Human Skeletal Muscle Plasticity." Frontiers in Physiology, 6, 283.