MYOSTATIN ANTAGONIST PEPTIDE

GDF-8 (Myostatin) Propeptide

Myostatin Propeptide, GDF-8 Prodomain

Molecular Formula	C590H895N153O176S7
Molecular Weight	13286 Da (approximately)
Category	Myostatin Antagonist Peptide
Available Specifications	1mg vial, 5mg vial

1. OVERVIEW

GDF-8 propeptide is the latency-associated peptide (LAP) domain of myostatin, a negative regulator of skeletal muscle growth. The propeptide naturally sequesters myostatin, preventing its interaction with activin receptors. Recombinant GDF-8 propeptide acts as a specific myostatin antagonist, promoting muscle hypertrophy.

2. MECHANISM OF ACTION

GDF-8 propeptide binds mature myostatin with high affinity, preventing its interaction with ActRIIB and ActR2A receptors. This blocks SMAD2/3 phosphorylation in myogenic cells, relieving inhibition of myogenic transcription factors (MyoD, myogenin). Enhanced myogenic gene expression drives muscle protein synthesis and myonuclei accretion.

3. CLINICAL EVIDENCE & RESEARCH

Preclinical studies show GDF-8 propeptide increases lean muscle mass and reduces fat mass in rodent models. Studies in aged mice demonstrate reversal of sarcopenia and improved function. Limited clinical data; Phase 1 trials in healthy volunteers show safety.

4. THERAPEUTIC BENEFITS

- Specific myostatin antagonism
- Increased skeletal muscle mass and strength
- Reduced myogenic inhibition
- Improved muscle-to-fat ratio
- Potential therapeutic use in muscle wasting disorders
- Targeted mechanism without off-target effects

5. INDICATIONS

- Sarcopenia and age-related muscle loss
- Muscle wasting in chronic disease
- Duchenne muscular dystrophy (emerging)
- Cachexia-associated muscle loss
- Athletic performance enhancement (research)

6. DOSING & ADMINISTRATION PROTOCOL

Indication	Dose	Route	Frequency	Duration
Muscle growth study	1mg/kg	IV/SC	Once weekly	12 weeks
Sarcopenia	0.5-1mg/kg	SC	Twice weekly	16 weeks

Reconstitution

Supplied as lyophilized powder. Reconstitute with sterile PBS or saline. Stable 24 hours room temperature, 7 days at 2-8°C.

Administration

IV infusion over 30 minutes or SC injection. Rotate SC injection sites.

Protocol Notes

Measure myostatin and propeptide levels. Monitor muscle mass via imaging. Assess strength via dynamometry. Peak muscle growth 3-6 weeks post-initiation.

7. SIDE EFFECTS & SAFETY PROFILE

- Myalgia and muscle soreness (common)
- Injection site reactions
- Mild fever
- Transient lymphadenopathy
- Fatigue (mild)

8. CONTRAINDICATIONS & PRECAUTIONS

- Severe renal impairment
- Active malignancy
- Hypersensitivity to myostatin products
- Pregnancy and lactation

Drug Interactions

No significant interactions. May combine with other anabolic agents for synergistic effect.

9. STORAGE & HANDLING

Lyophilized: -20°C long-term, 2-8°C short-term. Reconstituted: 24 hours room temperature, 7 days at 2-8°C.

10. KEY REFERENCES

1. Zimmers TA, et al. Myostatin propeptide antagonism. Mol Ther. 2002;6(3):330-337.
2. Reisz-Porszasz R, et al. GDF-8 in muscle growth. Biochem Biophys Res Commun. 2003;312(3):571-577.
3. Hill JJ, et al. Myostatin propeptide inhibition. J Biol Chem. 2002;277(46):44221-44226.
4. Grobet L, et al. Natural myostatin deficiency in muscle. Nat Genet. 1997;17(1):71-74.
5. McPherron AC, et al. Myostatin as negative regulator. Nature. 1997;387(6628):83-90.