BIOMOD LABS · RESEARCH PEPTIDE CO.

RESEARCH COMPOUND MONOGRAPH · SERIES 1 · NO. SPR-003

Semax + Selank (Nasal Spray Preparation)

A two-component aqueous nasal spray preparation combining the Russian Academy of Sciences ACTH(4-7)-Pro-Gly-Pro heptapeptide Semax with the related tuftsin-Pro-Gly-Pro heptapeptide Selank — engaging mechanistically distinct neuropeptide axes in a single 200-actuation metered-dose nasal-delivery preparation.

CATALOG REFERENCE	FORM FACTOR	STRENGTH	DATE OF ISSUE
BM-SPR-003	Nasal spray · 50 mg / bottle · 200 sprays · 0.25 mg per spray	50 mg total active per bottle (Semax 25 mg + Selank 25 mg)	May 2026

*This research preparation is a two-component nasal spray formulation combining **Semax** (a synthetic heptapeptide derived from ACTH(4-7) with a C-terminal Pro-Gly-Pro stabilising motif) and **Selank** (a synthetic heptapeptide derived from tuftsin with the same C-terminal Pro-Gly-Pro stabilising motif). Both molecules were developed at the Institute of Molecular Genetics of the Russian Academy of Sciences and share a common design philosophy — short bioactive parent sequence appended with Pro-Gly-Pro for plasma stabilisation against peptidase cleavage. The preparation is supplied at 50 mg total mass per bottle (25 mg Semax + 25 mg Selank) with 200 sprays at 0.25 mg per spray. The two-compound combination engages mechanistically distinct molecular pathways: Semax for BDNF and NGF expression and monoamine neurotransmission; Selank for tuftsin-receptor and GABAergic anxiolytic-class pathways.* ***This monograph summarises published cellular pharmacology and preclinical findings for laboratory research reference only.***

01 Component Composition

COMPONENT A — SEMAX	25 mg · Met-Glu-His-Phe-Pro-Gly-Pro heptapeptide (ACTH(4-7)-Pro-Gly-Pro) · CAS 80714-61-0 · Russian Academy of Sciences development
COMPONENT B — SELANK	25 mg · Thr-Lys-Pro-Arg-Pro-Gly-Pro heptapeptide (tuftsin-Pro-Gly-Pro) · CAS 129954-34-3 · Russian Academy of Sciences development
TOTAL MASS PER BOTTLE	50 mg active (200 sprays · 0.25 mg per spray · 0.1 mL per actuation)
VEHICLE	Aqueous nasal-grade vehicle with preservative
ANALYTICAL SPECIFICATION	Component-level ≥ 98 % purity by HPLC; content uniformity per actuation verified to ± 10 % of label claim

02 Rationale for Combined Composition

Semax and Selank are the two principal heptapeptides developed at the Institute of Molecular Genetics of the Russian Academy of Sciences sharing the C-terminal Pro-Gly-Pro stabilising motif. **Semax** corresponds to ACTH residues 4-7 (Met-Glu-His-Phe) with the appended Pro-Gly-Pro tripeptide; preclinical work has reported effects on BDNF and NGF gene expression in rat hippocampus and frontal cortex, modulation of dopaminergic and serotonergic neurotransmission, and effects on learning and memory consolidation markers in rodent paradigms. **Selank** corresponds to the tuftsin tetrapeptide (Thr-Lys-Pro-Arg) with the same Pro-Gly-Pro stabilisation; preclinical work has reported anxiolytic-class effects through tuftsin-receptor and GABAergic pathways. The combination engages two mechanistically distinct neuropeptide axes in a single nasal-delivery preparation.

03 Critical Chemistry-Handling Notes for the Combined Preparation

MULTI-COMPONENT HANDLING CONSIDERATIONS

Both components share the Pro-Gly-Pro C-terminal motif that confers substantial protease resistance — the Pro-Pro-Pro repeated proline geometry is a poor substrate for plasma peptidases. The principal handling consideration is the **N-terminal Met1 residue of Semax**, which is oxidation-susceptible. Antioxidant excipients are common in cited methodology. Selank is fully methionine-free and is among the more handling-tolerant peptides. The aromatic His and Phe residues in Semax are mildly photo-oxidation susceptible; opaque or amber bottle materials provide adequate light protection during normal use.

04 Nasal Delivery Considerations

INTRANASAL BIOAVAILABILITY AND VEHICLE CHEMISTRY

The intranasal route provides direct access to systemic circulation through the rich vascularisation of the nasal mucosa, bypassing first-pass hepatic metabolism characteristic of oral administration. For peptide-class compounds, the principal nasal-delivery considerations are (a) **mucosal residence time** — aqueous nasal vehicles produce relatively short mucosal contact, with peptide permeation governed by molecular size, lipophilicity, and chemistry of the active; (b) **vehicle pH** — neutral-to-slightly-acidic pH (5.5–7.0) is optimal for both nasal mucosa tolerance and peptide bond stability; (c) **osmolarity** — formulation osmolarity is targeted to approximate physiological isotonicity to minimise mucociliary disruption; (d) **preservative selection** — benzalkonium chloride or similar quaternary ammonium preservatives are standard for nasal aqueous formulations; (e) **permeation enhancers** may be incorporated in some formulations to support peptide passage across the nasal epithelium without disrupting mucosal integrity.

05 Laboratory Handling and Storage

The sealed nasal spray bottle is held at 2–8 °C refrigerated for long-term storage and may be brought to room temperature for working use. The preservative content of the aqueous vehicle supports limited room-temperature stability during in-use periods. Working concentrations and actuation counts are determined by the investigator's experimental design (0.25 mg total active per actuation, distributed approximately equally between Semax and Selank).

06 References

1. Ashmarin IP, Nezavibatko VN, Levitskaya NG, Koshelev VB, Kamensky AA. Design and investigation of an ACTH(4-10) analog lacking D-amino acids and hydrophobic radicals (Semax). *Neurosci Behav Physiol.* 1995;25(3):243–250. PMID: 8527826
2. Shadrina MI, Dolotov OV, Grivennikov IA, et al. Rapid induction of neurotrophin mRNAs in rat glial cell cultures by Semax. *Neurosci Lett.* 2001;308(2):115–118. PMID: 11457574
3. Kozlovskii II, Danchev ND. The anxiolytic spectrum of the Selank peptide and its effects on monoamine neurotransmission. *Eksp Klin Farmakol.* 2003;66(5):3–7. PMID: 18988498
4. Volchegorskii IA, Telesheva LF, Mester KM, et al. The effects of Semax on prooxidant-antioxidant balance under acute and chronic experimental cerebral ischemia. *Eksp Klin Farmakol.* 2014;77(8):20–24.