

RESEARCH MONOGRAPH . COMPOUND PROFILE

Yohimbine

An indole alkaloid alpha-2 adrenergic antagonist from Pausinystalia johimbe; the canonical pharmacological probe for noradrenergic activation.

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COMPOUND CLASS	Selective alpha-2 adrenergic antagonist

ABSTRACT

Yohimbine (17- α -hydroxy-yohimban-16- α -carboxylic acid methyl ester; CAS 146-48-5; molecular formula $C_{21}H_{26}N_2O_3$; molecular weight 354.45) is an indole alkaloid isolated from the bark of *Pausinystalia johimbe* (Rubiaceae) and from *Rauwolfia* species. The compound is a selective α -2 adrenergic antagonist (K_i approximately 1 to 5 nM) with secondary 5-HT_{1A} partial agonism (K_i approximately 100 nM); selectivity for α -2 over α -1 is approximately 50-fold. Pharmacologically, yohimbine increases central noradrenergic outflow by blocking presynaptic autoinhibition, producing anxiety, increased blood pressure, mydriasis, and tachycardia. Used in clinical research as a provocation test for panic disorder (where vulnerability to α -2 antagonism predicts panic susceptibility) and as a positive control in studies of noradrenergic regulation. Folk use as an aphrodisiac for erectile dysfunction has limited supporting evidence. Plasma half-life is approximately 0.6 hours. Used as the canonical α -2 antagonist in academic pharmacology.

1. 1. Compound Identification

Yohimbine is described as selective alpha-2 adrenergic antagonist. An indole alkaloid alpha-2 adrenergic antagonist from *Pausinystalia johimbe*; the canonical pharmacological probe for noradrenergic activation.

1.1. 1.1 Class summary

Selective alpha-2 adrenergic antagonist

1.2. 1.2 Subtitle

An indole alkaloid alpha-2 adrenergic antagonist from *Pausinystalia johimbe*; the canonical pharmacological probe for noradrenergic activation.

2. Abstract

Yohimbine (17- α -hydroxy-yohimban-16- α -carboxylic acid methyl ester; CAS 146-48-5; molecular formula C₂₁H₂₆N₂O₃; molecular weight 354.45) is an indole alkaloid isolated from the bark of *Pausinystalia johimbe* (Rubiaceae) and from *Rauwolfia* species. The compound is a selective α -2 adrenergic antagonist (K_i approximately 1 to 5 nM) with secondary 5-HT_{1A} partial agonism (K_i approximately 100 nM); selectivity for α -2 over α -1 is approximately 50-fold. Pharmacologically, yohimbine increases central noradrenergic outflow by blocking presynaptic autoinhibition, producing anxiety, increased blood pressure, mydriasis, and tachycardia. Used in clinical research as a provocation test for panic disorder (where vulnerability to α -2 antagonism predicts panic susceptibility) and as a positive control in studies of noradrenergic regulation. Folk use as an aphrodisiac for erectile dysfunction has limited supporting evidence. Plasma half-life is approximately 0.6 hours. Used as the canonical α -2 antagonist in academic pharmacology.

3. Mechanism of Action

Selective alpha-2 adrenergic antagonism (~50-fold over alpha-1); secondary 5-HT_{1A} partial agonism. Increases central noradrenergic outflow.

The mechanistic profile described above represents the consensus position from peer-reviewed literature where available; for compounds with sparse formal characterization, this section reflects vendor-grade reports and structurally-related class pharmacology and should be interpreted with appropriate caution.

4. 4. Pharmacokinetics and Routes of Administration

Pharmacokinetic data are summarized within the abstract for compounds with formal Phase 1 records. Compounds without published human pharmacokinetic studies are noted as such; investigators should treat the absence of data as a research limitation.

5. 5. Reported Research Dose Ranges

Research 5 to 20 mg per oral administration; clinical (off-label ED) 5 mg three times daily. Rodent studies 0.5 to 5 mg/kg.

Doses are scaled from clinical use where the compound is approved as a medicine, from Phase 2/3 trials where development advanced, or from rodent dose-response data scaled by allometric assumptions where the compound has no human clinical record. Investigators should treat dose ranges from research-chemical-grade vendors as starting points for their own pharmacokinetic and tolerability characterization rather than validated dosing recommendations.

6. Sourcing and Quality Verification

Investigators should obtain analytical confirmation of identity (mass spectrometry; for peptides, additionally amino acid analysis or N-terminal sequencing) and purity (HPLC area-percent, ideally greater than 95 percent) on every lot. Vendor certificates of analysis vary in quality; third-party analytical confirmation through independent laboratories (e.g., Janoshik Analytical, Anabolic Lab) is the gold standard for research-grade peptides and small molecules.

For compounds with established pharmaceutical-grade marketing in any jurisdiction, sourcing from the marketed product (where legal and accessible) provides the highest quality assurance.

7. 7. Reconstitution and Handling

Peptides should be reconstituted in bacteriostatic water or sterile water for injection in the volume appropriate to the desired concentration; lyophilized peptides should be allowed to come to room temperature before reconstitution to minimize precipitation. Reconstituted peptides should be stored refrigerated and used within the timeframe specified by the manufacturer (typically 14 to 30 days for bacteriostatic water reconstitutions, shorter for sterile water).

Small molecules: storage conditions vary by compound; consult the certificate of analysis for the specific product. Most are stable at room temperature in dry, dark conditions; oxidation-sensitive compounds (e.g., catecholamine precursors) require cool storage and protection from light.

8. 8. Stack Interaction Considerations

Investigators combining this compound with other research substances should consider receptor-level interactions (additive effects at shared targets), enzyme-level interactions (CYP-mediated drug-drug interactions where applicable), and pharmacodynamic interactions (additive sedation, additive serotonergic activity, additive hemodynamic effects).

The stack interaction section in published monographs of well-characterized compounds is necessarily incomplete for any specific combination; investigators should treat novel combinations with elevated caution and titrate gradually.

9. 9. References

1. Goldberg MR, Robertson D. Yohimbine: a pharmacological probe for study of the alpha-2 adrenoreceptor. Pharmacol Rev 1983.
2. Charney DS, et al. Noradrenergic function in panic anxiety: effects of yohimbine in healthy subjects and patients with agoraphobia and panic disorder. Arch Gen Psychiatry 1984.
3. Tam SW, et al. Yohimbine: a clinical review. Pharmacol Ther 2001.

This monograph is provided for research use only. Not for medical, diagnostic, or therapeutic purposes. Not for human consumption. Compound class generalizations are noted where compound-specific data are sparse; investigators should weight the evidence accordingly.