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Morphine is an arteriolar vasodilator in man

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View references (٣٤)

Abstract

AIM The mechanisms of action of morphine on the arterial system are not well understood. The aim was to report forearm vascular responses, and their mediation, to intra-arterial morphine in healthy subjects. METHODS Three separate protocols were performed: (i) dose ranging; (ii) acute tolerance; (iii) randomized crossover mechanistic study on forearm blood flow (FBF) responses to intrabrachial infusion of morphine using venous occlusion plethysmography. Morphine was infused either alone (study ١ and ٢), or with an antagonist: naloxone, combined histamine-١ and histamine-٢ receptor blockade or during a nitric oxide clamp. RESULTS Morphine caused an increase in FBF at doses of ٣٠ g min$^{-١}$ [٣,٢٥ (٠,٢٦) ml min$^{-١}$ ١٠٠ ml$^{-١}$] [mean (SEM)] doubling at ١٠٠ g min$^{-١}$ to ٥,٢٣ (٠,٥٣) ml min$^{-١}$ ١٠٠ ml$^{-١}$. Acute tolerance was not seen to ٥٠ g min$^{-١}$ morphine, with increased FBF [٣,٩٦ (٠,٣٥) ml min$^{-١}$ ١٠٠ ml$^{-١}$] (P = ٠,٠٠٣), throughout the ٣٠-min infusion period. Vasodilatation was abolished by pretreatment with antihistamines (P = ٠,٠٠٨) and the nitric oxide clamp (P < ٠,٠٠١), but not affected by naloxone. The maximum FBF with pretreatment with combined H١/H٢ blockade was ٣,٠٦ (٠,٤٨) and ٢,٩٠ (٠,١٧) ml min$^{-١}$ ١٠٠ ml$^{-١}$ after ٣٠ min, whereas with morphine alone it reached ٤,٣ (٠,٨٩) ml min$^{-١}$ ١٠٠ ml$^{-١}$. CONCLUSIONS Intra-arterial infusion of morphine into the forearm circulation causes vasodilatation through local histamine-modulated nitric oxide release. Opioid receptor mechanisms need further exploration. © ٢٠٠٩ The British Pharmacological Society.

Reaxys Database Information

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Author keywords

Histamine; Morphine; Naloxone; Nitric oxide; Opioid; Vasodilatation

Indexed Keywords

EMTREE drug terms: antihistaminic agent; histamine H١ receptor antagonist; histamine H٢ receptor antagonist; morphine; naloxone; nitric oxide; opiate receptor

EMTREE medical terms: adult; article; clinical trial; controlled clinical trial; controlled study; crossover procedure; dose calculation; drug mechanism; drug tolerance; forearm blood flow; human; human experiment; male; normal human; priority journal; randomized controlled trial; vasodilatation; vein occlusion plethysmography

MeSH: Adult; Dose-Response Relationship, Drug; Forearm; Histamine; Humans; Infusions, Intra-Arterial; Male; Middle Aged; Morphine; Plethysmography; Regional Blood Flow; Treatment Outcome; Vasodilation; Vasodilator Agents; Young Adult
Medline is the source for the MeSH terms of this document.

Chemicals and CAS Registry Numbers: morphine, ٥٢-٢٦-٦, ٥٧-٢٧-٢; naloxone, ٣٥٧-٠٨-٤, ٤٦٥-٦٥-٦; nitric oxide, ١٠١٠٢-٤٣-٩;Histamine, ٥١-٤٥-٦; Morphine, ٥٧-٢٧-٢; Vasodilator Agents

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