

The more we get, the more we need: Study shows how to prevent morphine 'tolerance'

November 1 2007

Tolerance to the pain-relieving effects of morphine – which builds rapidly with prolonged use – can be prevented by blocking a key substance that's formed when the drug is taken, researchers at the Saint Louis University of Medicine have discovered.

Their findings could lead to new therapies that allow morphine to be administered without patients becoming tolerant of it – a significant obstacle to effective pain relief – nor experiencing a host of severe side effects that accompany escalating doses of the painkiller.

The study is published in the November issue of *The Journal of Clinical Investigation* (<https://www.the-jci.org/article.php?id=32420>).

“We believe these findings represent a major breakthrough in understanding how tolerance to the pain-relieving action of morphine and other opiate medications develops – and how it can be prevented from happening in the first place,” said Daniela Salvemini, Ph.D., professor of internal medicine – division of pulmonary, critical care and sleep medicine at the Saint Louis University School of Medicine, and the study's lead author.

Morphine and other opiate narcotics are the most powerful treatments for acute and chronic severe pain, but their effectiveness lessens quickly and significantly with repeated doses.

As tolerance develops, increased doses are necessary for equivalent

relief. Escalating doses bring a variety of severe complications, including oversedation, reduced physical activity, respiratory problems, constipation and the strong potential for addiction.

Accordingly, there is major interest now in finding ways to administer morphine and other narcotics in repeated doses without bringing on tolerance or serious side effects.

Using an animal model, Salvemini and her colleagues found that that a substance called peroxynitrite plays a critical role in the development of morphine tolerance. Repeated doses of morphine cause peroxynitrite to develop in the spinal cord, which in turn causes inflammation and damage to proteins and DNA in that area.

The researchers found they could prevent morphine tolerance from occurring by therapeutically manipulating peroxynitrite – in other words, prevent it from working. They did that by either causing the substance to decompose once it had developed or by blocking it from forming in the first place.

“We believe our findings can be used by researchers to develop therapies that will allow patients to take morphine without becoming tolerant of its benefits,” said Salvemini. “For instance, when morphine is administered, another drug could be given simultaneously that prevents peroxynitrite from working and thus causing tolerance to develop.

“The benefit of this research is potentially quite large in terms of maintaining the pain-relieving effect of opiates such as morphine during prolong use while also reducing their side effects.”

Source: Saint Louis University

Citation: The more we get, the more we need: Study shows how to prevent morphine 'tolerance'
(2007, November 1) retrieved 6 May 2024 from
<https://medicalxpress.com/news/2007-11-morphine-tolerance.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.