

Study shows a single shot of morphine has long lasting effects on testosterone levels

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A single injection of morphine to fight persistent pain in male rats is able to strongly reduce the hormone testosterone in the brain and plasma, according to a new paper published in *Molecular Pain*. The study, led by Anna Maria Aloisi, M.D., of the Department of Physiology – Section of Neuroscience and Applied Physiology at the University of Siena, Italy, Sbarro Institute for Cancer Research and Molecular Medicine at Temple University in Philadelphia, University of Siena, and the Human Health Foundation in Spoleto, Italy, showed that opioids had "long lasting genomic effects in body areas which contribute to strong central and peripheral testosterone levels" including the brain, the liver and the testis.

The study showed increases in aromatase, an enzyme that is responsible for a key step in the biosynthesis of estrogen. The findings are particularly important since testosterone is the main substrate of aromatase, which is involved in the formation of estradiol. Both [testosterone](#) and estradiol are important hormones, engaged in cognitive functions as well as in mood, motor control and in many other functions, such as bone structure remodeling.

"Our lab became interested in gonadal hormones several years ago when it became clear that there were many differences in [pain](#) syndromes between the sexes," says Dr. Aloisi. "In looking at differences, it was immediately apparent that these changes were introduced by different treatments, opioids in particular."

"The research findings are very relevant to the management of patients with chronic pain," said Marco Pappagallo, M.D., professor and director of pain research and development, Department of Anesthesiology, Mount Sinai School of Medicine, New York, NY. "Today, primary care physicians, pain specialists, and a variety of health care professionals are asked not only to treat pain but how to manage side effects of drugs and to strive for the best possible comprehensive care and wellness of patients who experience chronic pain. Opioid induced hypogonadism can cause health complications to which patients with pain can be overly susceptible, including chronic fatigue, loss of stamina, emotional and sexual disturbances, as well painful skeletal and muscular complications."

It has been known that patients treated with opioids for short or long periods show low levels of gonadal hormones. Hypogonadism was already described in opioid users and applied to pain patients as OPIAD (opioid induced androgen deficiency). It is also known that patients treated with opioids, including newer drugs (fentanyl, tramadol) have a high probability to be hypogonadic, with menopausal symptoms occurring in women and andropausal symptoms in men.

"The use of opioids puts a 'physiological' block on the reproductive system and can induce a long lasting absence of these essential hormones from the blood and the [brain](#)," says Dr. Aloisi. "The normal effect of opioids to restrict reproduction in stressed subjects is multiplied by the higher levels/ long duration of opioids in the body."

"Until a few years ago this condition was completely unrecognized by physicians although some reports clearly showed it in many kinds of patients," notes Dr. Aloisi. "Today there remains some ignorance on this condition but gonadal hormones are more commonly cited as responsible for many chronic degenerative pathologies."

Despite the side effects of opioids, Antonio Giordano, M.D., Ph.D., Director of the Sbarro Institute for Cancer Research and Molecular Medicine, warns that the study's message is not meant to limit the use of opioids for pain. Instead, he suggests that doctors should "take into consideration this side effect, since it is very easy to find hormone replacement therapies. Using HRTs, patients can get relief from their pain, and improve their quality of life."

Provided by Sbarro Health Research Organization

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