



DRUGS IN THE NEWS

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Krokodil and the Law of Unintended Consequences

Submitted by Dwain Fuller, Section Editor



In 2003 Russia began a major crack-down on the trafficking and production of heroin, presumably in a good-faith effort to curtail its use. However, heroin users turned to other opiate sources for

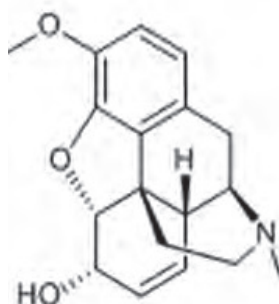
However, it seems more likely that the name derives from one of the chemical precursors of desomorphine, α -chlorococlide, which when spoken aloud sounds reminiscent of “crocodile”.

Desomorphine is a derivative of morphine in which the 6-hydroxyl and the 7, 8 double bond have been reduced. Desomorphine is not a new drug; it was patented in 1932 and is reported to be around 8-10 times more potent than morphine, with a fast onset and short duration of action. As was the case with crack cocaine, the combination of increased potency and shorter duration of action, may be the recipe for higher addiction liability.

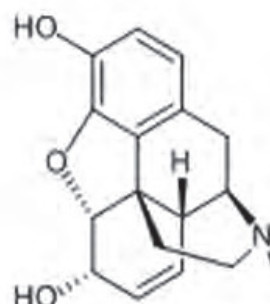
Desomorphine can be synthesized from codeine in a reduction reaction similar to that of reducing ephedrine/pseudoephedrine to methamphetamine; employing red

Sometimes well-intentioned actions result in unintended consequences. The field of study known as “game theory” is a formal investigation and description of such things, (i.e. when player A makes a certain move, how does player B respond?). Many times player A is a government and its law while player B represents the people affected by the law. When a government, player A, moves to influence or force people to do one thing, the people, player(s) B, often adjust their strategy and end up doing something that was unintended by player A. While this may sound like a segue into a discussion of the merits and drawbacks of the recent U.S. healthcare legislation, the focus is in fact on the other side of the globe; Russia.

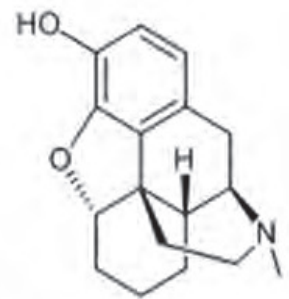
their needs. Clandestine chemists soon began to convert codeine, which until June 1, 2012 was available over-the-counter in Russia, to desomorphine, also known as Krokodil, or “Crocodile” in English. Many sources assert that the peculiar name comes from the scaly appearance of the skin that often results from desomorphine abuse.



codeine



morphine



desomorphine

Krokodil and the Law of Unintended Consequences (Continued)

phosphorous and iodine. One account of the clandestine synthesis is that 5 – 10 codeine-containing tablets are boiled with paint thinner and lighter fluid or gasoline, along with hydrochloric acid, iodine, and red phosphorous obtained from the striking surface of matchboxes. This reportedly results in a suspension of desomorphine along with all the reactants, solvents, and precursors.

Desomorphine has gained media



notoriety due to the severe tissue necrosis that is often associated with its use. The cause of the tissue necrosis is most likely not from the drug itself, but rather the chemical impurities that remain in the mixture after it is prepared from codeine. Besides the direct effect of these harsh chemicals on veins and tissue at the injection site, unfiltered particulate matter may be transported some distance from the injection site before causing a thrombosis. The effects of desomorphine are short-lived, yet the synthesis from codeine can be accomplished in less than one hour, therefore addicts tend to inject the quickly-prepared drug mix-

ture with no prior purification. It is this author's observation that due to the addiction liability of the drug along with its short duration of action, Krokodil abusers may also, as is seen with heroin, be "skin-popping" the drug to extend its effects and ward off withdrawal. This would, of course, further exacerbate the tissue necrosis. Regardless, the effects of these injections can be devastating to the underlying tissue, as the accompanying pictures, which are rather tame by comparison to many on the web, will attest.

At this writing, the use of desomorphine in the United States seems to be minimal. News accounts of its presence in the U.S. are largely unverified. An admittedly unscientific poll of attendees of the Elmer Gordon Forum at the SOFT meeting in Orlando, failed to identify anyone who had encountered it. A monograph produced by the U.S. Drug Enforcement Administration (DEA) in October 2013 states that in 2004 two exhibits were identified as desomorphine and none since.

Perhaps the fact that codeine is not available over the counter in the U.S., along with the media frenzy of the terrors of this drug, will prevent it from taking hold in the U.S. In the meantime, desomorphine and its deuterated analog are now commercially available, should laboratories wish to be proactive in developing methods for its detection and quantitation.

References and Further Reading

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