What are Opiates?

Opiates belong to the large biosynthetic group of benzylisoquinoline alkaloids, and are so named because they are naturally-occurring alkaloids found in the opium poppy. The major psychoactive opiates are morphine, codeine, and thebaine. Papaverine, noscapine, and approximately 24 other alkaloids are also present in opium but have little to no effect on the human central nervous system, and as such are not considered to be opiates. Semi-synthetic opioids such as hydrocodone, hydromorphone, oxycodone, and oxymorphone, while derived from opiates, are not opiates themselves.

While the full synthesis of opiates from naphthoquinone (Gates synthesis) or from other simple organic starting materials is possible, they are tedious and uneconomical processes. Therefore, most of the opiate-type analgesics in use today are either directly extracted from *Papaver somniferum* or synthesized from the natural opiates, mainly from thebaine.

Terminology

The term *opiate* refers only to the alkaloids found naturally in opium, but is often incorrectly used to describe all drugs with opium- or morphine-like pharmacological action, which are more properly classified under the broader term *opioid*.

The alkaloids

Morphine

The most frequently-reported occurrences of opiate-induced pulmonary edema are among recreational heroin users. Although uncommon, reports of morphine-induced pulmonary edema are not unheard of. The primary difference is the more careful supervision of morphine administration compared to the lack of supervision and medical expertise among illicit heroin users. On the other hand, morphine may also be used in the treatment of pulmonary edema. Despite morphine's being the most medically-significant alkaloid, larger quantities of the milder codeine—most of it manufactured from morphine—are consumed medically, as codeine has a greater and more predictable oral bioavailability than morphine, making it easier to titrate one's dose.

As heroin is not pharmacologically active it must first be metabolized. The active metabolites of heroin are morphine, 6-monoacetylmorphine and 3-monoacetylmorphine.

Morphine (INN) (pron.: /ˈmɔrfiːn/; MS Contin, MSIR, Avinza, Kadian, Oramorph, Roxanol, Kapanol) is a potent opiate analgesic drug that is used to relieve severe pain. It was first isolated in 1804 by Friedrich Sertürner, first distributed by him in 1817, and first commercially sold by Merck in 1827, which at the time was a single small chemists' shop. It was more widely used after the invention of the hypodermic needle in 1857. It took its name from the Greek god of dreams Morpheus (Greek: Μορφεύς). Morphine is the most abundant alkaloid found in opium, the dried latex extracted by shallowly slicing the unripe seedpods of the *Papaver somniferum* poppy. Morphine was the first active principle purified from a plant source and is one of at least 50 alkaloids of several different types present in opium, poppy straw concentrate, and other poppy derivatives. Morphine is generally 8 to 14 percent of the dry weight of opium, although specially bred cultivars reach 26 percent or produce little morphine at all (under 1 percent, perhaps down to 0.04 percent). The latter varieties, including the 'Przemko' and 'Norman' cultivars of the opium poppy, are used to produce two other alkaloids, thebaine and oripavine, which are used in the manufacture of semi-synthetic and synthetic opioids like oxycodone and etorphine and some other types of drugs. *P. bracteatum* does not contain morphine or codeine, or other narcotic

phenanthrene-type, alkaloids. This species is rather a source of thebaine. Occurrence of morphine in other Papaverales and Papaveraceae, as well as in some species of hops and mulberry trees has not been confirmed. Morphine is produced most predominantly early in the life cycle of the plant. Past the optimum point for extraction, various processes in the plant produce codeine, thebaine, and in some cases negligible amounts of hydromorphone, dihydromorphine, dihydrocodeine, tetrahydro-thebaine, and hydrocodone (these compounds are rather synthesized from thebaine and oripavine). The human body produces endorphines, which are endogenous opioid peptides that function as neurotransmitters and have similar effects.

In clinical medicine, morphine is regarded as the gold standard, or benchmark, of opioid analgesics used to relieve severe or agonizing pain and suffering. Like other opioids, such as oxycodone, hydromorphone, and diacetylmorphine (heroin), morphine acts directly on the central nervous system (CNS) to relieve pain. Morphine has a high potential for addiction; tolerance and psychological dependence develop rapidly, although physiological dependence may take several months to develop.

Codeine

Codeine or **3-methylmorphine** (a natural isomer of methylated morphine, the other being the semi-synthetic 6-methylmorphine) is an opiate used for its analgesic, antitussive, antidiarrheal, antihypertensive, antianxiety, sedative and hypnotic properties, to suppress premature labor contractions, myocardial infarction, suppress coughing, as well as many other uses. Codeine is the second-most predominant alkaloid in opium, at up to three percent. Although codeine can be extracted from natural sources, a semi-synthetic process is the primary source of codeine for pharmaceutical use. It is considered the prototype of the weak to midrange opioids (tramadol, dextropropoxyphene, dihydrocodeine, hydrocodone, oxycodone).

Esters of Morphine

There are several semi-synthetic opioids derived from the opiate morphine. Heroin (diacetylmorphine) is a morphine prodrug, meaning that it is metabolized by the body into morphine after administration. One of the major metabolites of heroin, 6-monoacetylmorphine (6-MAM), is also a morphine prodrug. Nicomorphine (morphine dinicotinate), dipropanoylmorphine (morphine dipropionate), desomorphine (di-hydro-desoxy-morphine), methyldesorphine, acetylpropionylmorphine, dibenzoylmorphine, diacetyldihydromorphine, and several others are also derived from morphine.

Withdrawal effects

Opiate withdrawal syndrome effects are associated with the abrupt cessation or reduction of prolonged opiate usage.

In medical facilities such as hospitals and clinics, the threat of relapse is possible when Post-acute-withdrawal syndrome is under-emphasized to patients in transitional phases, especially with short-term buprenorphine, methadone or health facilities.