Physiochemical Properties of Opioids Used in Acute and Chronic Pain

Opioid:	Binding affinity (Ki value, nM)[1]	Partition Coefficient (Log P)[a]	Molecular Weight (Da)[2]	Equivalent Equianalgesic IM dose (mg)[b]
Sufentanil	0.1380	3.95	386	~500-1000 times more potent
Buprenorphine	0.2157	4.98	468	~40 times more potent[c]
Hydromorphone	0.3654	1.84	285	1.5
Oxymorphone	0.4055	0.83	301	1
Levorphanol	0.4194	3.1[4]	257[4]	2
Morphine	1.168	0.76	285	10
Fentanyl	1.346	4.05	336	0.1 – 0.2
Oxycodone	25.87	0.82	315	20
Codeine	734.2	1.14	299	130

Updated November 12, 2020

Developed by Jeffrey J. Bettinger, PharmD | Reviewed by Drs. Jacqueline Cleary and Jeffrey Fudin

[a]Log P corresponds to the logarithm of the ratio of the concentrations of the studied compound in octanol and in water: LogP = Log (C_{oct}/C_{water}). Values obtained from Delyle SG et al)[2]

[b]For Equianalgesic IM doses, time of peak analgesia in non-tolerant patients ranges from one-half to on hour and the duration of four to six hours (derived from Inturrisi CE, 2002).[3] Doses are expressed in milligram strength.

[c]Potency when calculated for buprenorphine is relative, given it has different pharmacologic effects on opioid receptors than traditional opioid agonist medications.