

As you can see from the table above, activation of opiate receptors can have various effects.

Pain is modulated by action on specific sites in the central nervous system, particularly the dorsal horns of the spinal cord and the periaqueductal grey matter. Recent studies suggest that peripheral action may also occur.

Opiates not only affect sites along the pain pathways, but also the respiratory centre, cough impulse (depresses cough reflex by acting on a cough centre in the medulla), the vomiting centre (stimulation of chemoreceptor trigger zone in area postrema of the medulla causing nausea and vomiting) and also inhibit gut motility (propulsive peristaltic waves in the colon are decreased) : constipation is due to this and to increased colonic tone (spasm) and increased tone of anal sphincter.

They also affect the hormonal (endocrine) system (cause release of antidiuretic hormone which may explain the fluid retention that can occur) and the hypothalamus, which regulates body temperature. To begin with, body temperature is lowered, but it rises with chronic use of high doses.

Morphine releases histamine, a chemical that takes part in the inflammatory response (such as in nettle hives/ insect bites/ allergy reaction). **Dilation of cutaneous blood vessels** and subsequent histamine release can lead to flushing in the chest, neck and face, as well as to itching and sweating.

Miosis (pin point pupil) is due to (m and k receptors) excitatory action of the parasympathetic nerve innervating the pupil . This may result in difficulty with close-up focussing, for example, difficulty reading the telephone directory. Tolerance does not appear to develop to miosis.

Urinary urgency but difficulty in urination may occur due to inhibition of urinary voiding reflex. The amplitude of ureteral contractions may be increased. Opiates can also lead to urinary retention by causing spasm of the bladder sphincter, particularly in men with prostatism.

Biliary colic and epigastric distress results from tone increase in the sphincter of Oddi and in the bile duct causing increase in pressure in the biliary tract (this increases pain of gall stones). Opiates reduce gastric, pancreatic and biliary secretions.

They are also known to affect the immune system in a complex manner. Studies of drug abuse have found that there may be a degree of immunosuppression due to these drugs and this can lead to increased susceptibility to infections in vulnerable patients. Whether this is a problem with prescribed doses is unclear.

Sedation and 'mental clouding' are known side-effects of opioids.

The mood changes are related to the effects on the limbic system and nucleus accumbens. Opioids do not tend to cause the euphoria experienced by recreational users when used for pain relief. However, they may reduce the negative emotional response to pain.

Some of the untoward effects from opioids are in fact exploited to treat conditions such as diarrhoea, cough and shortness of breath in acute left heart failure (which causes fluid in the lungs).