Love (or maybe lust) not only blocks pain, it also seems to stimulate the same parts of the brain as cocaine.

Intense spells of passion are as effective at blocking pain as cocaine and other illicit drugs, a team of neuroscientists say. Tests on 15 American students who admitted to being in the passionate early stages of a relationship showed that feelings for their partner reduced intense pain by 12% and moderate pain by 45%.

In the study, researchers at Stanford University showed eight women and seven men photographs of their partners while delivering mild doses of pain to their palms with a hot probe. At the same time, the students had their brains scanned by a functional magnetic resonance imaging machine. At the end of each test, the students were asked to rate how much pain they felt.

Feelings of love, triggered by a photo of their partner, acted as a powerful painkiller. Brain scans revealed that these feelings caused more activity in parts of the brain that are also triggered by morphine and cocaine. Looking at an image of an attractive friend rather than their partner had only a mild analgesic effect.

The study went on to investigate whether distracting the students also reduced pain by giving them simple mental tasks, such as naming sports that do not involve a ball.

The brain scans showed that while both love and distraction reduce pain, they appear to act on different pathways in the brain.

Jarred Younger, who led the study published in Plos One, said: "With the distraction test, the brain pathways leading to pain relief were mostly cognitive. The reduction of pain was associated with higher, cortical parts of the brain.

"Love-induced analgesia is much more associated with the reward centres. It appears to involve more primitive aspects of the brain, activating deep structures that may block pain at a spinal level: similar to how opioid analgesics work."

He added, "One of the key sites for love-induced analgesia is the nucleus accumbens, a
key reward addiction centre for opioids, cocaine and other drugs of abuse. The region tells the brain that you really need to keep doing this."

Younger’s team recruited students in the first nine months of a relationship, when feelings of passion are at their most intense.

"We intentionally focused on this early phase of passionate love. We specifically were not looking for longer-lasting, more mature phases of the relationship. We wanted subjects who were feeling euphoric, energetic, obsessively thinking about their beloved, craving their presence," Sean Mackey, a co-author on the paper, said.

"When passionate love is described like this, it in some ways sounds like an addiction. We thought, maybe this does involve similar brain systems as those involved in addictions."

guardian.co.uk © Guardian News and Media Limited 2010