**No more bad backs or migraines! Scientists crack the secret of why some people can't feel pain - and the breakthrough could lead to 'super painkillers'**

* **People who lack a neural sodium channel Nav1.7 genetically can't feel pain**
* **Scientists used transgenic mice to recreate the condition in a laboratory**
* **They discovered the pain-free condition is caused by opioid peptides**
* **This breakthrough could lead to the development of 'super painkillers'**

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A rare genetic condition that makes some people unable to feel pain has been recreated in the lab for the first time - and it could point to a painless future for millions of people.

Scientists used mice to recreate the conditions seen in people who lack a neural channel specifically linked with pain, or lack thereof.

The approach combines drugs that block pain receptors with low doses of opioid painkillers and the experts believe it could be the 'secret recipe' to a pain-free life.

Pain is transmitted to the brain as electrical signals along nerve cell membranes, known as channels.

A sodium channel called Nav1.7 is particularly important for pain, and people born with non-functioning Nav1.7 do not feel pain - yet can still feel normal touch.

When drugs designed to block this channel are administered, hardly any pain reduction is experienced.  
  
However, the researchers from University College London found that people who naturally lack Nav1.7 also produce higher than normal levels of opioid peptides.

These are chemicals related to powerful painkillers such as morphine.

After trials in genetically-modified mice, they gave naloxone, an opioid blocker, to a 39-year-old woman with the rare mutation - and she felt pain for the first time in her life.

This is the first time experts have successfully found a link between channel and opiods, and exploited it, in this way.

Broad-spectrum sodium channel blockers are used as local anaesthetics, but cause complete numbness and can have serious side-effects over time.

Opioid painkillers such as morphine are known to be highly effective painkillers, but this reduces as tolerance builds and they can be highly addictive.

'After a decade of rather disappointing drug trials, we now have confirmation that Nav1.7 really is a key element in human pain,' said Professor John Wood of UCL Medicine.

'The secret ingredient turned out to be good old-fashioned opioid peptides. Used in combination with Nav1.7 blockers, the dose of opioid needed to prevent pain is very low,' he explains.

The team, which has published its findings on [**Nature**](http://www.nature.com/ncomms/2015/151204/ncomms9967/full/ncomms9967.html#f2), plans to test the new combination drug in human trials by 2017.

The work relied on the use of 'transgenic' mice, which were genetically modified to replicate the mutation that prevents some humans from feeling pain.

'Without the work in transgenic mice, none of this would have been possible and we still wouldn't know how to help the millions of chronic pain patients around the world', said Professor Wood