

Maximum pain is aim of new US weapon - tech - 02

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The US military is funding development of a weapon that delivers a bout of excruciating pain from up to 2 kilometres away. Intended for use against rioters, it is meant to leave victims unharmed. But pain researchers are furious that work aimed at controlling pain has been used to develop a weapon. And they fear that the technology will be used for torture.

"I am deeply concerned about the ethical aspects of this research," says Andrew Rice, a consultant in pain medicine at Chelsea and Westminster Hospital in London, UK. "Even if the use of temporary severe pain can be justified as a restraining measure, which I do not believe it can, the long-term physical and psychological effects are unknown."

The research came to light in documents unearthed by the Sunshine Project, an organisation based in Texas and in Hamburg, Germany, that exposes biological weapons research. The papers were released under the US's Freedom of Information Act.

One document, a research contract between the Office of Naval Research and the University of Florida in Gainesville, US, is entitled "Sensory consequences of electromagnetic pulses emitted by laser induced plasmas".

It concerns so-called Pulsed Energy Projectiles (PEPs), which fire a laser pulse that generates a burst of expanding plasma when it hits something solid, like a person (**New Scientist** print edition, 12 October 2002). The weapon, destined for use in 2007, could literally knock rioters off their feet.

Pain trigger

According to a 2003 review of non-lethal weapons by the US Naval Studies Board, which advises the navy and marine corps, PEPs produced "pain and temporary paralysis" in tests on animals. This appears to be the result of an electromagnetic pulse produced by the expanding plasma which triggers impulses in nerve cells.

The new study, which runs until July and will be carried out with researchers at the University of Central Florida in Orlando, aims to optimise this effect. The idea is to work out how to generate a pulse which triggers pain neurons without damaging tissue.

The contract, heavily censored before release, asks researchers to look for "optimal pulse parameters to evoke peak nociceptor activation" - in other words, cause the maximum pain possible. Studies on cells grown in the lab will identify how much pain can be inflicted on someone before causing injury or death.

Long-term risk

New Scientist contacted two researchers working on the project. Martin Richardson, a laser expert at the University of Central Florida, US, refused to comment. Brian Cooper, an expert in dental pain at the University of Florida, distanced himself from the work, saying "I don't have anything interesting to convey. I was just providing some background for the group." His name appears on a public list of the university's research projects next to the \$500,000-plus grant.

John Wood of University College London, UK, an expert in how the brain perceives pain, says the researchers involved in the project should face censure. "It could be used for torture," he says, "the [researchers] must be aware of this."

Amanda Williams, a clinical psychologist at University College London, fears that victims risk long-term harm. "Persistent pain can result from a range of supposedly non-destructive stimuli which nevertheless change the functioning of the nervous system," she says. She is concerned that studies of cultured cells will fall short of demonstrating a safe level for a plasma burst. "They cannot tell us about the pain and psychological consequences of such a painful experience."

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