

Meet the biohackers letting technology get under their skin

June 27 2016, by Kevin Warwick, Coventry University



Credit: Grindhouse Wetware/Ryan O'Shea

For some people, the human body isn't a temple. Instead they see it as a source of frustration thanks to the considerable limitations compared to the powerful technology available today. In the last few years, a [new community](#) of biohackers or "grinders" has sprung up to experiment with enhancing the human body with technology. Largely outside of the mainstream disciplines of science or philosophy, it is a raw, exciting field that turns longstanding ethical beliefs on their head.

It is a long time since my own first electronic implant – a simple radio frequency transmitter – [was inserted in 1998](#). It allowed me to open doors and switch on lights with a wave of my arm. To do it I had the assistance of my GP in his surgery, not only to burrow a hole in my arm, but to make sure that my implant remained in place and that no infection occurred.

Most biohackers today do not have such luxuries but instead [carry out operations themselves](#), learning as they go about basic medicine and sterilisation (often merely dousing needles and scalpels in alcohol). In 1998, I had the comfort of local anaesthetic, not so many of today's subjects do, although a friend may well be on hand in case of fainting.

Perhaps the most common implant tried out is the radio frequency identification device (RFID), more recently in the form of a near field communication (NFC) version. This is essentially the same technology as is used in contactless payment cards except that it's packaged in a small tube about the size of a grain of rice. Back in 1998 my RFID was almost an inch long -- technology has clearly moved on since then.

Durability and reliability are no problem. My colleague Mark Gasson had his RFID implanted in 2009 and it's still working perfectly, with no rejection or operational problems. But you do need external technology to transmit power to the implant, which has no battery, and to communicate with it.

In the last couple of years we have seen a number of companies enter the fray, although a cynic might suggest that this has been more for publicity than anything else. For example, in January 2015 it was widely reported that several hundred office workers in Sweden [had been chipped](#). With their implants – put in place by a tattoo artist – the workers were able to open doors and switch on the photocopier.



Kevin Warwick gets an armful. Credit: Kevin Warwick

For biohackers, the range of possible technology that can be implanted is broad and imaginative. Software developer and biohacker Tim Cannon has a [variety of implants](#), his latest being [the Northstar](#), which lights up when a magnet is close by. His company in Pittsburgh, Grindhouse Wetware, actually develops technology for biohackers. Then there is [Lepht Anonym](#) who plans to have a small compass chip implanted near her left knee, along with a power coil that can be charged externally.

Artists also get in on the act. [Moon Ribas](#) has a seismic sensor implanted in her elbow that allows her to feel earthquakes through vibrations. Meanwhile, [Neil Harbisson](#), who is otherwise colour blind, has a camera which is attached to his skull. Different colours cause the frequency of vibrations to his skull to vary. As a result he has learned a very high

degree of colour discrimination. And we should not forget the [digital artist Stelarc](#), who has even grown an ear on his arm.

Magnetic personalities

Quite a few biohackers have magnets implanted in their fingers. These can be excited by small coils of wire linked to external sensors such as ultrasonics or infrared. This allows the recipient to "feel" the distance to objects or remote heat. My student Ian Harrison carried out a [detailed study](#) for his PhD that included having magnets implanted, to show just how responsive these magnets could be.

But the most advanced example has to be what is now called neurohacking, which involves modifying the brain or nervous system. In 2002, I had a "BrainGate" device implanted in the nerves [in my arm](#) to enable me to control a robot hand via the internet using my thoughts. It also gave me an extra, ultrasonic sense, so that as an object came closer to me the electronic pulses stimulating my brain increased in frequency. Recently the same implant was used in a therapeutic role to allow a paralysed individual to [regain some control](#) over his own arm.

Clearly there are potential benefits to biohacking, which we are seeing already in the use of these neuro-controlled prosthetics. But in time we will witness such implants for human enhancement used to improve memory and to communicate by thought. But for the most part, it's currently a case of sheer investigation to see how far the boundaries can be pushed.

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