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3/30/18

Technology in Health Paper

Curing the blind is a subject that summons up visions of miracles and science-fiction, but with new advances made by Chinese researchers, this dream is coming closer to reality. The team of researchers from Fudan University have experimented with taking the dead photoreceptors out of blind lab mice and replacing them with artificial versions made of gold and titanium. These artificial photoreceptors function exactly the same way their organic counterparts do effectively without any degradation over time. The procedure in question has only been tested on mice and only works when the remaining eye and brain systems continue to function. However, it offers a tantalizing glimpse towards a future without blindness.

The researchers from Fudan University noted that the few outright solutions to blindness required large clunky equipment and external power, providing a low-quality image that varies between largely useless and slightly functional. Their goal was to create a solution that would restore as close to normal vision as possible without any of the paraphernalia that other experimental research required. While it is impossible to tell exactly what the mice who received the procedure saw, their eyes were able to effectively respond to light stimuli again after being unable to do so before the procedure. This proved conclusively that their eyes were sensitive to light again after losing that ability due to their gradual blindness. Further, after eight weeks none of the mice had shown signs of infection or other health problems.

It remains to be seen how well this procedure will work on human patients. The artificial photoreceptors are not capable of transmitting all the wavelengths that human eyes, or even mouse eyes, can see. Anyone who received the artificial photoreceptors would only be able to see green, blue, and some wavelengths close to the ultraviolet spectrum, leaving them colorblind. The surgery would also take much longer and be far more complicated on a human, partially because the human eye is larger, and partially because the structure is slightly different, requiring the procedure and artificial photoreceptors to be modified. Unfortunately, the procedure is of little to no value for those that suffer from other forms of blindness, only working when the patient has the connection between the eye and brain intact and functional, but without working photoreceptors. However, there is still the possibility that other advances and changes as a result of this research could lead to breakthroughs in treatments for other forms of blindness.

Should this technology and procedure become commonplace, the entirety of the human population that suffers from gradual blindness from diseases like retinitis pigmentosa and macular degeneration could be reversed effectively overnight. Eliminating these forms of blindness would be a massive improvement for the quality of life for the elderly, although there are many younger people who also suffer from the same maladies. While hardly the cure-all for blindness, it would still be a leap in our treatment of it. The rippling effects of this extraordinarily precise surgery becoming commonplace could also be felt throughout many other fields of medicine. The ability to easily modify, repair, or replace such small parts of the human body would be a massive boon to all of humanity.

Sources

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