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Author(s)	Schneider, GE; You, SW; So, KF; Carter, DA; Khan, F; Ellis-Behnke, R; Okobi, A
Citation	30th Annual Meeting of the Society for Neuroscience, New Orleans, Louisiana, November, 4-9 November 2000, v. 26, p. 611
Issued Date	2000
URL	http://hdl.handle.net/10722/53986
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Abstract View

VISUAL FUNCTION DUE TO REGENERATION OF OPTIC NERVE OR OPTIC TRACT THROUGH PERIPHERAL NERVE HOMOGRAFTS.

[G.E. Schneider^{1*}](#); [S.-W. You²](#); [K.-F. So³](#); [D.A. Carter⁴](#); [F. Khan¹](#); [R. Ellis-Behnke¹](#); [A. Okobi¹](#)

1. *Dept. Brain & Cognitive Sciences, MIT, Cambridge, MA, USA*

2. *Fourth Mil.Med. Univ., Xian, China*

3. *Univ. Hong Kong, Hong Kong, Hong Kong*

4. *Med. College of Ohio, Cincinnati, OH, USA*

Segments of sciatic nerve from one leg were used to induce regeneration of transected optic nerve (ON) or tract in Syrian hamsters. In the first group, the nerve graft was sutured to the stump of the transected ON of the right eye in young adult animals, and the other end was placed below the surface of the ipsilateral superior colliculus (SC); the opposite eye was removed. In one animal, orienting movements in the wrong direction were elicited and recorded on videotape, beginning when the animal was more than 1.5 yr old, over 1 yr after surgery. In the second group, a similar procedure was used but with the nerve going to the contralateral SC. In 3 of 4 long-term survivors, visually elicited turning was obtained and recorded, most reliably in the final 4 mo of their 2-yr life. Regenerating retinofugal axons were traced and their terminations in SC reconstructed using a CT-B procedure and immunohistochemistry (secondary AB conjugated to Alexa-488) and fluorescence microscopy. The visually unresponsive animal had no regeneration, and the most responsive animal had the greatest amount of regeneration. In a 3rd procedure, the right brachium of SC was transected, and 2 or 3 segments of sciatic nerve were implanted as bridges to elicit optic tract regeneration. The first 3 of these animals were operated at age 13-19 days; considerable regeneration was verified anatomically in each case, after behavioral demonstration of visual orienting. *Supported by: NIH grant EY00126.*