



Early support for the development of optogenetics at Stanford University

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As the technology of optogenetics becomes more significant for the practice of neuroscience and intact-systems biology, it is useful to take note of where initial funding for the early experiments was derived, which is of historical interest and is also important for crediting the early supporters.

Karl Deisseroth interviewed for a faculty position in the Stanford Bioengineering department in the fall of 2003, and he received a formal offer in the spring of 2004. Scott Delp, Chair of Bioengineering, provided dedicated lab space for KD in the basement of the West Wing of the Clark Center at Stanford, supported by the Schools of Medicine and Engineering, which KD began using as principal investigator in July of 2004 along with his first group of graduate students.

The funding over the first year from July 2004 to June 2005 came from several sources. To support the development of optogenetics, KD began spending his Bioengineering faculty startup funds provided from the Schools of Medicine and Engineering in the summer of 2004, derived from foundation and donor sources (including the Whitaker Foundation, the Psychiatry Department and the Oberndorf Family fund, and the Neuroscience Institute at Stanford). He also received salary and research support as a principal investigator in the Psychiatry Department at Stanford from his National Institute of Mental Health (NIMH) grant beginning July 1 2004 (his T32-funded postdoctoral fellowship had formally ended June 30 2004), so that when KD introduced the first microbial opsin (a channelrhodopsin) into neurons in July of 2004, he was formally a principal investigator in the Psychiatry department chaired by Alan Schatzberg, with lab space from Bioengineering chaired by Scott Delp, and graduate students from the Neuroscience Program at Stanford. KD added bioengineering to his psychiatry PI appointment in January 2005, and additional (20%) salary support came from the Psychiatry department linked to his clinical work as a psychiatrist. In summary, from the very first optogenetic experiments, KD was jointly supported by three entities as principal investigator (PI): the Stanford Department of Bioengineering, the Stanford Department of Psychiatry, and the federal National Institute of Mental Health.

In many ways the success of the first experiments therefore depended on cooperative support (indeed, not only from funding agencies but also from the Stanford community, as the Deisseroth group was able when needed to borrow and employ key items of molecular biology, centrifugation, physiology, tissue culture, vector preparation, and other equipment from four or five other laboratories while resources were still being shipped or under construction). Together this broad-based support enabled the early optogenetics experiments to be carried out from July of 2004 through the spring of 2005, leading ultimately to KD's submission of the first paper as principal investigator and senior/corresponding author in the spring of 2005; the paper was published in the summer of 2005 (*Nature Neuroscience* 8, 1263-1268). This history highlights the importance of flexible funding for early-stage principal investigators, as well underscoring the significance of broad-based community support and of substantive collaboration between the disciplines of engineering and medicine.

Scott Delp, PhD.

Chair of the Stanford Department of Bioengineering 2002-2007

Alan Schatzberg, MD

Chair of the Stanford Department of Psychiatry 1991-2010