

Abstract

In Germany more than 100.000 people are blind due to retinitis pigmentosa or age related macula degeneration. These retinal diseases damage the light sensitive cells of the eye, the photoreceptors. The restoration of elementary vision in these patients is the primary research goal of the German retina implant project. Scientists from many institutes cooperate to finally develop a visual prosthesis. Its basic principle is to electrically activate intact nerve cells in close vicinity of the degenerated photoreceptors. Experimental tests of functional implant models in humans are ethically not yet acceptable. Therefore, animal experiments are necessary to demonstrate electrically evoked brain activity. In this context, the thesis presents statistical methods for the quantification of information transmission from the stimulation device to the visual brain centers. The analyses indicate low intensity resolution, but a medium spatial and comparably high temporal resolution achievable with a retina implant. The results provide suitable stimulation parameters for the efficient coding of visual scenes.