S. K. Gautam, A study of current spread in artificial electrical stimulation of the cochlea, M. Tech. Thesis, School of Biomedical Engineering, Indian Institute of Technology Bombay, 1990.

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Abstract – For the appropriate stimulation of the cochlea in cochlear prosthesis, it is important to study the current spread that takes place within the confines of the cochlea during artificial electrical stimulation. This thesis deals with the study of current spread in tank models as well as scaled-up physical models of scala tympani.

We have measured the potential differences at different distances from an electrode tip submerged in the model, in order to study the current spreading as a function of fluid conductivity, model geometry, stimulation and electrode configuration. The potential differences are seen to fall rapidly when we move away from the electrode in monopolar stimulation.

The data obtained from this study may be useful for stimulus deconvolution techniques in cochlear stimulation strategies.