Evaluation of implant recipient interactions by ESR spectroscopy

Przemysław Płonka, Beata Płonka, Stanisław J.Łukiewicz

Feasibility of inducing an ESR triplet signal, associated with nitric oxide production and formation of nitroso-heme complexes has been studied, using heart allograft implantation and *in vitro* incubation of isolated hearts. A technique of implanting rats' hearts into skin pockets of allogenic hosts was applied for *in vivo* studies, whereas *in vitro* experiments were performed on isolated gerbils' hearts. The ESR triplet signals of high intensity were demonstrated in both cases upon use of Varian X-band spectrometer, regular rectangular cavity and a technique of low temperature measurements (at 77 K). The triplet signals seen during the rejection of allografts have been ascribed mainly to immune reactions, involving activated macrophages. On the other hand, the structural damage and functional deviations in the incubated heart tissue were assumed to be responsible for the ESR triplets found in the *in vitro* studies. The end effect is the same in these two groups of processes: it is the synthesis of nitroso-heme complexes, although the underlying mechanisms differ. Therefore, one can expect both types of phenomena to be additive.