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(54) Title: MECHANISMS OF MYOBLAST TRANSFER IN TREATING HEART FAILURE

(57) Abstract: Bioengineering the regenerative heart provides a novel treatment for heart failure. On May 14, 2002, a 55-year-old man suffering ischemic myocardial infarction received 25 injections carrying 465 million cGMP-produced *pure* myoblasts into his myocardium after coronary artery bypass grafting. Three myogenesis mechanisms were elucidated with 17 human/porcine xenografts using cyclosporine as immunosuppressant. Some myoblasts developed to become cardiomyocytes. Others transferred their nuclei into host cardiomyocytes through natural cell fusion. As yet others formed skeletal myofibers with satellite cells. *De novo* production of contractile filaments augmented heart contractility. Human myoblasts transduced with $VEGF_{165}$ gene produced six times more capillaries in porcine myocardium than placebo. Xenograft rejection was not observed for up to 20 weeks despite cyclosporine discontinuation at 6 weeks.

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