Tissue Engineering Therapy for Cardiovascular Diseases

To the Editor:

We read with interest the review by Nugent and Edelman. The authors have discussed seeding of prosthetic vascular graft but have not commented on the difference between single-stage and two-stage seeding. Single-stage seeding involves extraction of endothelial cells (ECs), coating of graft lumen, and implanting the graft into the patient, all within the time frame of a few hours. Two-stage seeding is when cells are harvested, cultured for a few weeks, and then used for seeding. It is the latter procedure that has been successful clinically, as discussed by the authors. Single-stage seeding, which has used fat as a source of ECs, has so far in small trials had inferior results compared with two-stage seeding. One reason as explained in the review article has been the poor cell attachment and retention of ECs if seeded only for a few hours before exposure to pulsatile blood flow. We have recently shown that this may be improved by using multiple sequences of arginine-glycine-aspartate (RGD) to improve cell retention. The other reason for the poor results of single-stage seeding is thought to be due to the type of cells extracted from subcutaneous fat, which are not mainly composed of ECs, and this is still debated. For the latter problem, we have been using positive purification of ECs using magnetic beads with encouraging results.

To allow seeding to become an important tool for the treatment of peripheral vascular disease, it is important to be able to undertake single-stage seeding, which is useful for the acutely ischemic legs where it is obviously not possible to wait a few weeks to culture cells before undertaking a two-stage seeding procedure.

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