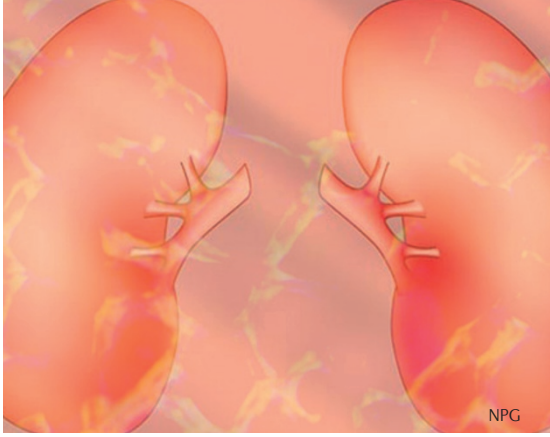
BIOBUSINESS BRIEFS

DEAL WATCH

Shire increases focus on regenerative medicine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Shire has agreed to buy Pervasis Therapeutics in a deal worth up to US$200 million, gaining its most advanced programme: an endothelial cell-based product known as Vascugel that is in Phase II trials in patients with end-stage renal disease who are undergoing haemodialysis. The deal follows Shire's $750 million purchase in 2011 of Advanced BioHealing, which included the US Food and Drug Administration (FDA)-approved Dermagraft, a human fibroblast-derived dermal substitute for the treatment of diabetic foot ulcers.

Cell-based therapies — whereby new cells are transplanted into a tissue to restore or establish normal function — have numerous existing and potential applications. Strategies based on haematopoietic cells are widely used in the treatment of various cancers as well as blood and immune disorders, but recent years have also seen substantial progress in the application of cell-based therapies in other areas. "Non-haematopoietic cells have been evaluated in multiple trials, and it appears that the field of regenerative medicine holds significant promise, with several products already on the market in the areas of skin, cartilage or bone repair," says Leslie Silberstein, Professor of Pathology and Director for the Center for Human Cell Therapy, Harvard Medical School, Boston, USA. "In addition, stem/progenitor cell-based therapeutic products hold promise for multiple indications, including exciting advances in ocular disorders — in particular, limbal stem cell transplant for the treatment of corneal diseases," he adds.

Despite these advances, delivery issues have hampered the success of cell-based therapies. "One of the key challenges of cell-based therapies is limited engraftment of the cells when injected. Often, only small fractions of injected cells remain at the injection site, which limits their therapeutic effects," explains Jason Burdick, Associate Professor, Department of Bioengineering, University of Pennsylvania, USA. The technology developed by Pervasis aims to address this issue. Its leading agent Vascugel is composed of adult differentiated allogeneic endothelial cells that are embedded within a collagen scaffold, resembling the natural extracellular matrix. "Carriers, such as the collagen-based scaffolds used by Pervasis, help to retain cells at the location of implantation. This improves the efficacy of these cell-based therapies," notes Burdick.

Vascugel is placed on the outside of the blood vessel at the arteriovenous (AV) access site in patients undergoing haemodialysis. Currently, complications following AV access procedures are common and can include infection, blood clots and narrowing of the vessel, which frequently lead to AV access failure. "The challenge with vascular access is to maintain the artificial high-flow state that we create with an AV fistula and graft, when the natural human response is to slow it down. This is typically a native response to reduce the outflow of these high-flow accesses with aggressive venous intimal hyperplasia," explains Mitchell Henry, Professor of Surgery, Ohio State University, USA, and President of the Vascular Access Society of the Americas. "A typical 1-year patency following placement of a prosthetic graft, without any interventions, would be 50%. The requirement for multiple interventions to maintain patency or the creation of a new access is problematic and expensive," he adds.

Vascugel mimics a healthy endothelium, secreting inhibitory compounds including transforming growth factor-β1, heparan sulphate, nitric oxide and tissue inhibitors of matrix metalloproteinases to inhibit thrombosis, inflammation and proliferation of the cell layer underlying the endothelium, thereby enabling endothelial regeneration and maintaining normal blood flow to critical organs. "The potential to alter the environment of these vessels such that the pathogenic processes are inhibited, thus improving patency, is intriguing. This is a unique approach in that it proposes to address a physiological abnormality with a physiological solution," concludes Henry.

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