

The Beat Goes ON

The latest in heart disease research and technology.

By Julie Cox

Heart disease remains the number one cause of premature death in the United States. Therefore, a massive amount of research takes place to try to help fight, endure or, better yet, prevent the symptoms and risks associated with cardiovascular problems. Here are a few of the latest findings and technologies that may benefit people who have heart health issues.

When someone undergoes coronary artery bypass surgery, vessels from that person's leg, arm or chest are used to bypass the blocked arteries in the heart. For some people, it is difficult for the surgeon to find suitable vessels. For instance, the vessels may be too small in diameter or may have other problems, such as plaque build-up, that makes them unsuitable for use in surgery. These patients, and various others who require bypass of other arteries such as those in the kidneys or lower limbs, will be glad to know scientists have engineered blood vessels under study.

These vessels are created from biopsies of skin cells and endothelial cells from the inner lining of veins, and are taken from the back of a patient's hand. Those cells are then grown in a lab over a period of six to eight weeks to develop proteins. A sheet of cells and proteins may then be rolled and created into a blood vessel. These are the first engineered vessels that do not require synthetic materials. So far, the vessels have been used in patients receiving hemodialysis (using arm vessels) rather than for heart vessels, as the seriousness of a potential failure is lower with arm vessels for experimental purposes. The outcomes so far are promising in that no vessel failures have occurred. With continued study, engineered vessels may eventually offer hope for bypass patients. By eliminating the need to harvest vessels from other areas of the body, using engineered vessels should help minimize the discomfort and level of complexity of bypass surgery. (This study is funded by Cyto-graft Tissue Engineering and the National Heart, Lung, and Blood Institute).

Another promising surgery option is on the horizon for heart patients with coronary artery disease involving multiple vessels. Combining robot-assisted coronary artery bypass procedures and stented angioplasty has produced good results on twenty-seven patients. The surgery method, studied by surgeons and researchers

at Virginia Transplant Center at Henrico Doctors' Hospital in Richmond, is minimally invasive (closed-chest vs. open-chest), which means that patients stay in the hospital about half the time of typical bypass patients, and also may return to activities and work in about one week vs. 6-12 weeks. The procedure uses the internal mammary artery in the patient's chest to bypass clogged heart arteries. This robotic surgery, via the daVinci computer interface, was endoscopically performed on twenty-seven patients who had multi-vessel disease, which included the main artery feeding the front of the left ventricle. Angioplasty was done and stents were placed in other blocked arteries that could not be bypassed. Angioplasty and stenting occurred either at the time of robotic surgery or within about a month prior to or after surgery. Results of a catheterization performed three months post-surgery showed that the bypass vessels had remained open (only one had a slight narrowing which was re-opened with angioplasty).

Since heart disease is a gradual process whereby plaque accumulation leads to buildup in arteries and obstruction of blood flow, scientists hope to find methods to reverse the buildup once it is there. Current cholesterol medications and lifestyle therapies typically prevent further accumulation and may reverse risks for future buildup, but do not reverse the plaque already present. Researchers in Los Angeles' Cedars-Sinai have performed animal studies that may provide hope for reversal. One gene therapy study showed that injection of a gene led to reduced plaque and beneficial effect on the immune response shown to contribute to plaque accumula-

