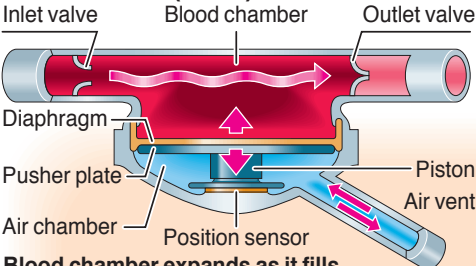


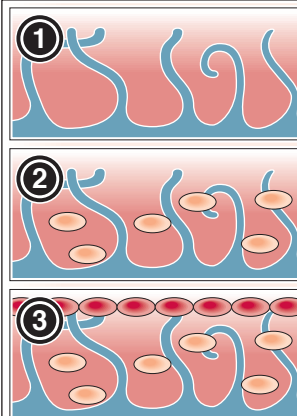
New pump helps heart patients

A revolutionary new pump to assist the function of the heart has been approved for sale by U.S. authorities. Implanted in the abdomen, the air-driven device – which is now available for worldwide sale – remains attached to the heart until donor organs become available. In clinical trials it has doubled the survival rate of patients awaiting transplants

The HeartMate Left-Ventricular Assist Device (LVAD)



Blood chamber expands as it fills through inlet valve. Pressure from air rushing into chamber behind pusher plate pushes disc forward to pump blood through outlet valve



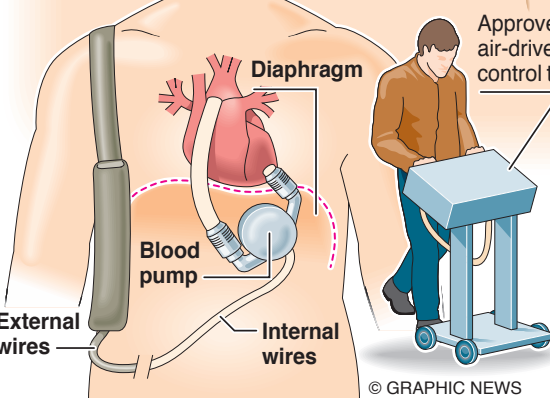
The 'living' lining –
Pump's textured, blood-contacting inner surfaces play a vital role in reducing blood clots which can lead to strokes. As a result, anticoagulation (blood clotting) treatment may be reduced to a single aspirin a day

- 1. Textured surface; 2. Natural cellular components and protein deposits are trapped
- 3. 'Living' lining forms – similar to normal vein and artery structures

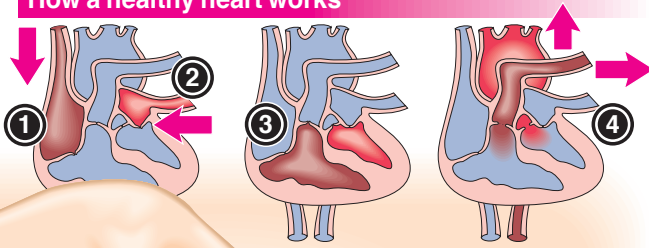
Electrical LVAD system

An alternative, battery-powered, device which has supported patients for as long as 17 months is currently undergoing clinical trials. This would allow patients to live at home while awaiting transplants

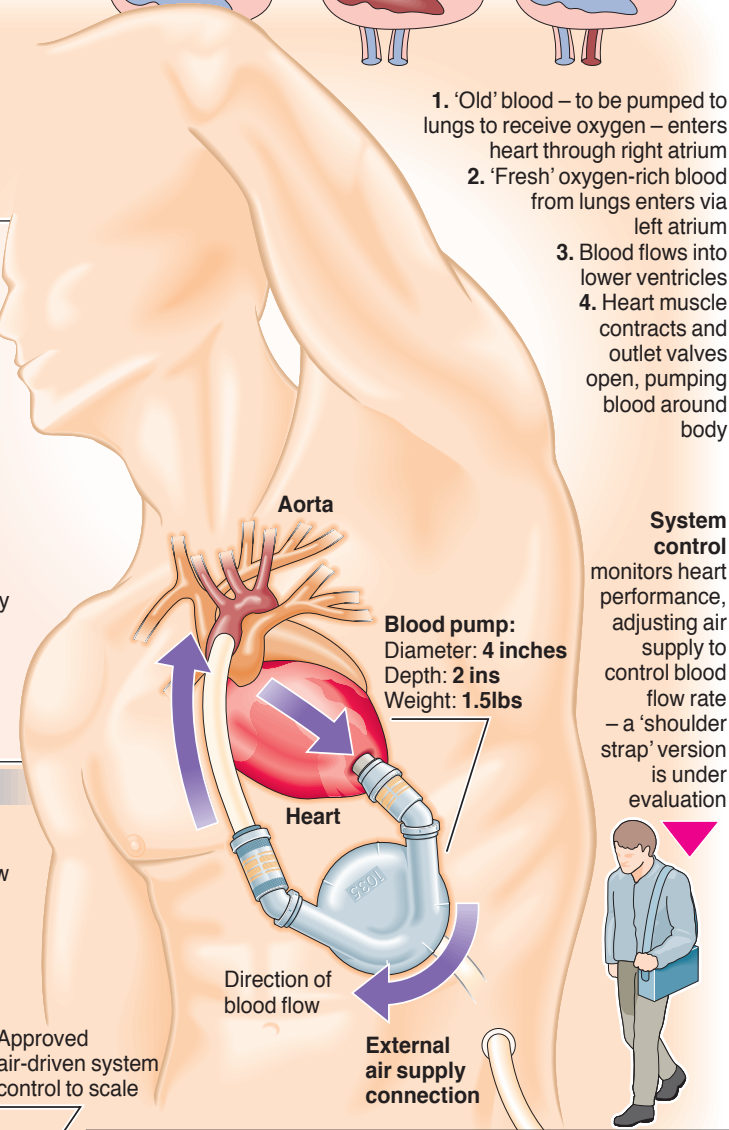
External battery pack and controls



How a healthy heart works



- 1. 'Old' blood – to be pumped to lungs to receive oxygen – enters heart through right atrium
- 2. 'Fresh' oxygen-rich blood from lungs enters via left atrium
- 3. Blood flows into lower ventricles
- 4. Heart muscle contracts and outlet valves open, pumping blood around body



System control
monitors heart performance, adjusting air supply to control blood flow rate – a 'shoulder strap' version is under evaluation

