

Testing Drugs with a Simulated Human Heart



Dr. Helen Maddock, a Coventry University Scientist and an expert in cardiovascular physiology and pharmacology from the University's Centre for Applied Biological and Exercise Sciences, has developed a new technique that uses samples of beating heart tissue to test the effect of drugs on the heart. This is done without using any human or animal trials. The new technique is a breakthrough development and has the potential to save hundreds of lives as well as significantly improve the quality of treatment for cardiovascular patients.

A primary cause of treatment failure in heart patients is the adverse effects generally associated with cardiovascular drugs. Things become more difficult when these side-effects become evident only after the patient has used the drug. This new *in vitro* technique introduced by Dr. Maddock uses a specimen of the heart tissue attached to a rig thus allowing the muscle to be lengthened and shortened while it is stimulated by an electrical impulse. The result is a mimicking of the biomechanical performance of cardiac muscle. Drugs that are still in trial can be added to this tissue to gauge the possible side effects on the force of contraction of the muscle and of the heart. Thus, with this new technique, new drugs can be tested *in vitro* when previously they could only be tested *in vivo* on living animals and often with no conclusive results.

Dr. Maddock has taken nearly ten years to develop this technology. She was primarily driven by the realisation that the existing methods of assessing the contractility of the heart were not entirely effective and that there was a need for a more accurate method to determine the safety of cardiovascular drugs without testing them on humans or animals.

This unique technique has provided the medical world with a very realistic model of heart dynamics and has opened up numerous possibilities to identify negative effects of cardiovascular drugs at an early stage. Not only can this technique save lives but can also help in a speedy development of potentially successful drug treatments.

Dr. Maddock is already in the process of implementing her ground-breaking technique. She has established a company InoCardia Ltd. from Coventry University in the UK, and has already received funding of a quarter of a million pounds from Mercia Fund Management, a Warwickshire-based technology investment company. She is also already in discussions with a multinational biopharmaceutical company with a view to applying the assay in the pharmaceutical industry.

Dr. Maddock is very enthusiastic about her new technique, "I'm delighted that our research is at a stage where we can confidently say the work-loop assay we've created is the world's only clinically relevant *in vitro* human model of cardiac contractility. It has the potential to shave years off the development of successful drugs for a range of treatments." This new technique offers a ray of new hope for cardiovascular patients and should facilitate the drug development process as well as decrease the cost of new drug development.

Source: [AlphaGalileo](#)

Image credit: Coventry University

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