

A discipline for the Renaissance man

Biological effects of ultrasound

Yesterday's science fiction is today's fact... We've seen Saturn and Jupiter up close. Microwaves are cooking our food and bacteria are making insulin. Cars now run on sewage gas and plutonium supplies the energy to power heart pacemakers. Nothing, it seems, is beyond the realm of the possible. It's not surprising therefore that current research indicates ultrasound may have an unlooked-for application — in the lowering of blood pressure.

Today, ultrasound is not the unfamiliar term it was in the past. It has been widely applied in physiotherapy for over 25 years to soothe bruised, stiff or damaged muscles. In obstetrics, it is becoming the method of choice for scanning unborn babies, thereby providing valuable information to both mother and doctor. And now, work being carried out by scientists at NRC and Ottawa's Civic Hospital extends

the uses of ultrasound. According to Alan Mortimer, a medical physicist at NRC's Division of Electrical Engineering, it has been shown to lower the blood pressure in the isolated hearts of rats.

"Ultrasound is the name given to mechanical vibrations at frequencies above the human hearing limit (about 16 kHz)," explains Mortimer. In current medical practice, frequencies ranging between 900 and 10 000 kHz (10 MHz) are commonly used. However, the difference between therapeutic and diagnostic use of ultrasound is not in the frequency but in the intensity, that is, in the energy per unit area. (Intensities used in this study are in the

same range as those applied in physiotherapy).

The kind of research Mortimer and his colleagues are engaged in calls for input from a variety of people, technicians, surgeons, biologists and physicists, all of them prepared to try their hand at almost anything: medical, biological or technological. "Having worked together in the past on such things as pacemakers and heart defibrillation," comments Alan Mortimer, "we are all able to contribute to the understanding of how ultrasound can affect the heart muscle. Both careful physics and careful biology must be done. And they have to be done at the same time."

Brian Trollope, Alan Mortimer and Jack Scott prepare for an operation. (Photo: Bruce Kane, NRC)

Brian Trollope, Alan Mortimer et Jack Scott se préparent à entreprendre l'opération. (Photo: Bruce Kane, CNRC)

