

## Chairman's Report 2013

The work of the scientists of the Liver Group has concentrated this year on pushing forward the development of our bioartificial liver being funded by our Wellcome Trust Translational Award, 2013 being the first full year of that grant funding; and on a parallel project that will in due course allow the applicability of the liver machine to be extended by developing techniques for the bioartificial liver devices to be kept frozen but 'at the ready' available whenever required. In last year's report I outlined the aims of the Wellcome-funded project, which builds on years of basic research funded in large part by the Liver Group Charity: we are required to 'tie down' the design and manufacture of our bioartificial liver device based on cultured liver cells, which will supplement liver function in patients with liver disease, thus buying time for recovery to take place or for liver transplantation to be arranged. Much of the year has been spent in perfecting the 'scaling-up' process, so now we can prepare a liver device containing over seventy billion cells at the ready, held in millions of small alginate beads, in a chamber through which a patient's blood plasma can be circulated. We have also progressed with refinements to the circuit, for instance developing and incorporating filters to prevent cell debris, or DNA derived from the cultured cells, escaping into the circuit and passing into the patient's circulation.

The parallel project on cryopreservation, holding the alginate-encapsulated cells frozen at very low temperatures, is progressing well; the scientific requirement is to develop further a process which is well recognised and in routine use – the freezing of small numbers of separated cells – to allow the freezing of huge numbers of cells which, in their encapsulated form, have a complex 3-dimensional structure. This work has involved collaboration with cryobiologists, mathematicians to model heat and cold transfer, and industry; it is another example of the way in which the Charity works, raising funds so that pilot, proof-of-principle studies can be performed, and then peer-reviewed grant funds raised.

One particular means of applying the Charity's funds has been to part-fund PhD projects, either sharing the payment of the candidate's stipend or supporting the consumable costs of their experiments. In this way the laboratory supports one or more PhD students in each of the three years of their course, and they combine important contributions to the science produced by the laboratory with acquisition of rigorous scientific skills.

The grant-raising activities of the Liver Group continue to be of major importance to allow us to take on new projects – though always allied to the aims of treating liver disease better; one of our PhD students is developing the approach I alluded to briefly last year, a 'bolt-on' to the bioartificial liver circuit to combat sepsis, and that work, initially funded only by the Liver Group, has now attracted further funding from two medical charities.

We remain as always immensely indebted to those who have and who continue to support our work. I should thank also two of our Trustees, Professor David Kerr and Professor Roger Penrose, who have kindly agreed to take over, jointly, as Patrons of the Charity.



Humphrey Hodgson  
Chairman