with 20 or 40 second pulses in the absence of functional ligase. Therefore it seems that the pieces of DNA synthesized during short periods are not attributable to the action of endonuclease. If molecular biologists feel that they invented the subject themselves, they would probably be happier with their handiwork if the Okazaki mechanism remains as the way in which DNA is replicated.

In the same issue of the *Journal of Molecular Biology* (**52**, 91, 107), Mushynski and Spencer report the occurrence of pyrimidine tracts in the DNAs of phages T7 and λ, which they have studied in an effort to come to grips with the initiation points (promoter regions) of DNA-directed RNA polymerase transcription.

Only one of the strands of T7 DNA (the r strand) is transcribed *in vivo*, and the same strand exclusively binds G-rich polymers. Therefore it has been suggested that the promoter sites are pyrimidine runs in the DNA. Mushynski and Spencer separated the strands of T7 DNA, and obtained the pyrimidine tracts from each strand by degradation of the DNA with formic acid and diphenylamine. The tracts were fractionated into isostichs by chromatography on DEAE-cellulose. They found that the longest pyrimidine isostichs, containing eleven, twelve and thirteen nucleotides, arose exclusively from the r strand. But shorter stretches of pyrimidines were present in both strands. They noted that the isostichs containing twelve and thirteen nucleotides have together twelve components, equal to the number of mRNA species known to be transcribed off the T7 genome *in vivo*. The isostich 13 has seven components, and it has also been found that there are seven tightly binding promoter sites on T7 DNA. Therefore Mushynski and Spencer speculate that these longer pyrimidine tracts may indeed be the promoter sites, and also the areas responsible for poly G binding. In all cases, runs of C would be broken up by T residues, however. Equally they cannot exclude that shorter C-rich tracts interspersed with purines could both bind poly G and be potential promoter sites, except that they occur commonly in both strands. One observation which correlates with their suggestion that the long pyrimidine oligonucleotides are likely to be the regions specifically binding poly G is that λDNA, which contains several A-rich purine tracts (deduced from the complementary pyrimidine oligonucleotides), is able to bind poly U, whereas T7 DNA, lacking these tracts, does not.

To make further progress, it will be necessary to isolate and characterize the authentic poly G binding sites, and this should be possible with the techniques now available.

TRANSPLANTATION

Successes and Problems

from a Correspondent

An opportunity to review the progress and value of transplantation was provided by the international congress of the Transplantation Society held in the Hague during the first week of September. There was general agreement that kidney grafting is now an established and useful procedure; more than 4,000 transplants have been performed. The longest surviving patient, who received the kidney from a twin, is well after fifteen years. Although there have been no important conceptual advances in kidney grafting during the past few years, results continue to improve as experience in the care of patients increases. The survival of grafts for one year is nearly 80 per cent from related donors and 50 per cent when donors are dead and unrelated to recipients. Twenty-two of the 165 hearts which have been transplanted are functioning. Twenty-six of the patients concerned survived for more than a year, and sixteen are alive after one to two years. The recipient who has survived longest, a patient of Dr R. R. Lower (Richmond, Virginia), is in very good health twenty-five months after the operation. A few patients with liver grafts are also surviving after more than a year. There has been little success so far with grafts of other organs, but after many earlier disappointments, successful engraftment of bone marrow has been achieved in patients with aplasia of their own blood forming tissue.

Serological tissue typing has been clarified technically, but although, as Dr P. Terasaki (University of California, Los Angeles) reported, a perfect match occurs in approximately 25 per cent of grafts between brothers and sisters with excellent results, such a match is rare between unrelated individuals. It is unfortunate that although degrees of mismatch can be determined, this ranking is not useful for predicting the outcome of organ grafts, except in perfect or nearly identical matches. Thus, because it is difficult to avoid rejection by matching there is a great need for better methods of overcoming rejection. Antilymphocyte serum (ALS), which is an extremely potent immunosuppressant experimentally, has proved difficult to obtain in an efficacious and non-toxic form. Nevertheless, hopes were expressed that improved purification and assay methods would produce useful ALS preparations, probably as adjuncts to the conventional immunosuppression of azathioprine and corticosteroid drugs.

Several experimental models described at the meeting have succeeded in part in satisfying the eventual goal of transplantation research, which is the specific abrogation of the immune response for the organ graft, without increasing the liability to serious infections. These models, in pigs, rodents and dogs, were described by Professor R. Y. Calne (University of Cambridge), Dr J. R. Salaman (London Hospital) and Dr R. E. Wilson (Peter Bent Brigham Hospital, Boston). At present the results obtained by using antigenic extracts from the donor to produce specific graft acceptance are unpredictable, and what is true for a graft of a certain tissue in a given species is often not applicable with a different organ in another species. Progress, however, has been encouraging and further studies along these lines may lead to predictable and safe methods of making an individual accept an organ graft without the necessity of prolonged treatment with potentially dangerous agents.

The idea of a bank of perfectly preserved organs stored for transplantation is still far from fulfilment. Simple cooling slows the deterioration of isolated organs and will allow twelve hours of kidney preservation, during which time tissue typing can be performed and the organ can be transported to an appropriate recipient. Complicated equipment that perfuses the organ with an artificial circulation can extend the period to twenty-four hours, according to Dr F. O. Belzer (University of California, San Francisco). But the heart, lung and liver are more sensitive and cannot be preserved for so long.