



50TH ANNIVERSARY
The Voice of Transplantation for Fifty Years



The History of the BTS

A brief history of the British
Transplantation Society
1972 - 2022

James F Douglas - 2015

This history incorporates and expands the history compiled by Professor Mary G McGeown in 2001 (revised in 2007 and 2015). Thanks are due to many BTS members, past and present, who have contributed invaluable information regarding the history of transplantation and of the society. Members are welcome to point out errors and omissions and to suggest amendments to this account, which is offered as a general overview of both the story of the BTS and the progress of transplantation.



The British Transplantation Society (BTS) is the professional voice of transplantation in the United Kingdom. It is the only society that represents and supports all professionals involved in transplantation in the country. It strongly encourages all those working in this field to become members to enable it to be truly representative of this wide community, for the benefit of patients. The BTS is actively involved in informing strategies that impact on organ donation and transplantation across the UK; in commenting to the media on relevant issues; and in developing the scientific, clinical and ethical practices that promote the best care and outcomes for patients. As the voice of transplantation professionals in the UK, its purpose is to provide leadership, representation and guidance for the benefit of patients. This purpose is supported by six strategic objectives:

- 1 **To Advance:** To advance scientific and clinical research and innovation relevant to the practice of transplantation;
- 2 **To Influence:** To influence public opinion and operational strategy relevant to transplantation;
- 3 **To Promote:** To promote excellence in professional standards and ethics across the multi-disciplinary transplant community;
- 4 **To Contribute:** To contribute to the advancement of transplantation, from organ donation to long-term follow up, in order to maximise patient and graft outcomes for all organs;
- 5 **To Support:** To support transplant professionals, in order to sustain individual and workforce resilience;
- 6 **To Collaborate:** To collaborate with relevant groups and individuals to ensure that the professional transplant community maintains a focus on health inequalities and what matters to patients in order to live well with a transplant.

Membership is open to all who work professionally in the field of transplantation, whatever their role. It includes clinicians from a wide range of specialities, basic scientists, scientists working in histocompatibility and immunogenetics, nurses, donor co-ordinators, professions allied to medicine, ethicists and more. There are significant opportunities and professional benefits for members.

Such are the description and purposes of the society, as set out in its current website. This brief history will endeavour to trace its development from the early days of clinical transplantation to the position it occupies in 2022, fifty years from its foundation.

The Inaugural Meeting of the society took place on April 12 1972 at the Royal Free Hospital in London. This was the culmination of a process whereby members of the London Transplant Club which, under the direction of Mr John Hopewell, a prominent pioneer transplant surgeon, had been meeting there regularly to discuss issues of organ sharing, transplantation and tissue typing, decided, after discussion at the British Society of Immunology (BSI) in October 1971, that there was a need for an organisation to represent the views of all those in the United Kingdom who were working on transplantation. Those meetings, now called Congresses, have continued without interruption since that date. In the spring of 2022, the BTS had been in existence for fifty years.

The impetus for the creation of the society came from the pressing need to understand more about all aspects of this new treatment and to improve its outcomes. Clinical transplantation in 2022 is firmly established and the science underpinning it is fairly well understood. This was not the situation in 1972 when the BTS first met. Successful kidney transplantation had been possible since 1954 but was still beset by many problems, especially those of rejection and the risks of immunosuppressive therapy; and the transplantation of other major organs was still in its infancy. It was the need for fuller understanding of the rejection process and the ambition to find better and safer ways to overcome it that helped to bring the society into being.

The many developments since 1972 are fully recorded in the medical and scientific literature and need not be described in detail here, although they are central to, and often resulted from, the work of members of the BTS and its sister organisations. However, the early history of transplantation deserves more attention for several reasons. First, it is inherently interesting. Second, although some excellent accounts exist, these are not always readily available. Third, it should prove instructive to BTS members who have no personal knowledge of the period, as well as to the general reader. Fourth, it provides an explanatory background to the birth of the society.

The early history of transplantation

There are many accounts of the development of transplantation, some by the pioneers in person. Differences as to the significance, primacy and originality of important developments have been known to occur. This summary attempts to record the best-known events, while acknowledging the possibility of some inaccuracy.

The concept that a diseased body part might be replaced by a healthy organ from a recently dead person was already present in the Middle Ages. Paintings from the fifteenth century record the legend of Saints Cosmas and Damian. The saints, having removed the cancerous leg from a sleeping man, are shown replacing it with a healthy one transplanted from a dead man. Nearer to our own time, in 1902, Emerich Ullman, in Vienna, found that a dog kidney, auto-transplanted to the neck, produced urine, as did dog-to-dog, and even dog-to-goat, transplants.



A verger's dream
Saints Cosmas and Damian
performing a miraculous cure by
transplantation of a leg.
Oil painting attributed to the
Master of los Balbases
WELLCOME COLLECTION CC BY



Alexis Carrel

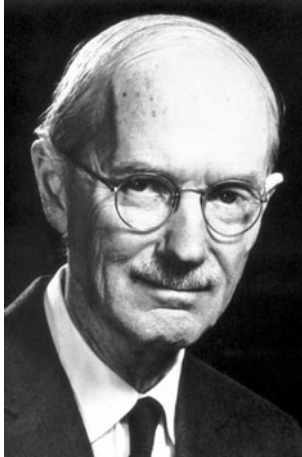
In 1905, in Boston, Alexis Carrel repeated Ullman's experiments, but found that, after producing urine for a few days, the kidneys failed. Nevertheless, his extensive work on surgical procedures, notably vascular suturing, laid the groundwork for future operative techniques and in 1912 won him the Nobel Prize. In 1906 Mathieu Jaboulay, in Lyon, France, reported two unsuccessful human xenografts in cases of chronic renal failure, indicating that the immunological barrier was not yet recognised. It was Carl Williamson, in the USA, in 1923, who first examined a failed kidney transplant, described its histology and introduced the term 'rejection'. In 1933, in the Ukraine, Yurii Voronoy made unsuccessful attempts to transplant kidneys between human subjects. At that time, while the surgical challenges of kidney transplantation had been overcome, the problem of rejection seemed to be insuperable.

Events external to surgery now influenced progress. During the Second World War, the bombing of large cities and other catastrophes of conflict led to many cases of multiple injury. Thanks to improved medical management, casualties with extensive burns, who would formerly have died from loss of plasma, fluid and electrolytes, or from infection, now often initially survived, albeit with large areas devoid of skin. Unfortunately, skin autografts, despite attempts to maximise the use of available tissue, were often insufficient. These cases not only stimulated research into methods of tissue replacement, but also intensified the need to understand the process of



Yurii Voronoy

tissue rejection. Already, even before the First World War, interest in the future discipline of immunology had begun. In 1903 Carl Jensen had reported that tumour cells injected into mice grew better in some than in others. If such an injected tumour resolved, re-injection of identical tumour cells into the same mouse failed to produce another growth.



George Davis Snell

In 1936 George Davis Snell, working in the Jackson Laboratory in Maine, USA, began to study the behaviour of transplanted tumours. He developed highly inbred strains of mice over a decade of sibling mating. Within each strain, every mouse had the same genetic constitution. He showed that transplanted tumours grew in all mice of the same strain but were rejected by all other strains. These tumour cells would grow only if the donor and recipient shared certain dominant genes. If not, they were destroyed by host ('killer') lymphocytes. Snell realised that similar principles must also regulate growth of normal tissue and began to identify the relevant genes. He called them 'histocompatibility genes', a title which he modestly attributed to his neighbour across the hall. He found at least eighty genes of differing strengths and named the strongest the H2 gene. Meanwhile, in London, in 1936 and 1937, Peter Gorer had identified four leucocyte antigens in the mouse, using heterologous sera, which he designated I, II, III and IV. One of the genes segregated with susceptibility and resistance to a transplantable tumour. In 1946 he went to Bar Harbor where, working with Snell's inbred mice, he showed that leucocyte antigen II corresponded to Snell's locus, the H2 gene.

Although skin taken from a woman's thigh had been used successfully to reconstruct her nose as early as 1823, and similar grafts had been used in India for hundreds of years, later workers seemed unaware of the difference between autografts and allografts. Erich Lexer stated in 1911 that skin grafts invariably failed, even between parent and child, and dismissed reports of past successes as fables. Nevertheless, some forms of tissue grafting had been effective. For example, in 1905 the first successful corneal transplant was carried out by Eduard Zirm in what was then the Austro-Hungarian Empire.

During the 1940s, in London, Peter Medawar, Rupert Billingham and Leslie Brent studied skin transplantation. Medawar's publications on skin autografts and allografts appeared in 1944. In a joint study with Snell, he showed that a graft of foreign skin into an unborn mouse would survive. This was the basis for later concepts of tolerance and enhancement. Medawar also discovered that, in rabbits, a second graft from an initial donor underwent accelerated rejection. Later, in the 1950s, WJ ('Jim') Dempster found an identical effect in dogs; and several groups showed that human skin grafts behaved in the same way. Blood group compatibility had once been considered important in skin grafting but, from the 1920s, it had been known that it did not in fact ensure graft survival. Following the demonstration by Medawar's group that non-identical cattle twins, which shared a foetal circulation, mutually accepted skin grafts after birth, the importance of Snell and Gorer's histocompatibility antigens in transplantation was realised. Similar effects were found in mice injected with leucocytes in the pre- and post-natal period. Even more important was the discovery that tolerance could be induced. This had not been predicted by Medawar. He had



Peter Medawar skin-grafting a cow. The unexpected acceptance of grafts exchanged between chimaeric bovine fraternal twins was the key to understanding tolerance. Rupert Billingham was the photographer.

PHOTO CSF PERSPECTIVES

been invited to distinguish identical from non-identical cattle twins by the skin grafting technique. Instead, he went on to develop his seminal studies in acquired tolerance.

The enormous casualty lists of the Second World War had focused attention, not only on skin destruction, but also on loss of renal function, which previously had been poorly understood. Many severely wounded patients often survived the initial trauma, only to die later from acute oliguric renal failure associated with haemo- and myoglobinuria. In victims of bomb compression injury with muscular damage, the condition was known as 'the crush syndrome' and had a mortality of over ninety per cent. All previous attempts to replace renal function by dialysis had failed. But in 1944, in the Netherlands, Willem Kolff reported the successful treatment of acute renal failure by means of his 'artificial kidney'. He had shown, for the first time, that many cases of acute renal failure were self-reversing, if the patient could be kept alive by haemodialysis until the kidneys recovered. Interest in dialysis began to revive. After the war Kolff gave artificial kidneys to the Hammersmith Hospital in London, Mount Sinai in New York, and the Royal Victoria Hospital in Montreal, where they were used with some success. He also gave one to Amsterdam; but it was never used. In 1948 Eric Bywaters and Mark ('Jo') Joekes published a series of twelve patients treated by haemodialysis at the Hammersmith Hospital. These events led to the creation, in 1952, of the Renal Association. Founder members included Robert Platt and Arthur Ellis, interested mainly in nephritis, Clifford Wilson, working on hypertension and diabetes, and Robert McCance, Douglas Black and Malcolm Milne, investigating electrolyte problems.

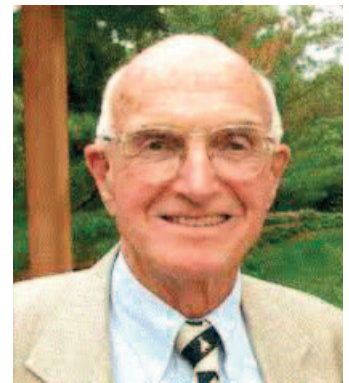
The belief grew that dialysis could also be used to treat irreversible chronic renal failure. This re-ignited hopes for transplantation, if only the major obstacle – rejection – could be overcome. Charles Hufnagel, David Hume and Ernest Landsteiner, working on acute renal failure in Boston, had shown that short-term human allograft function was achievable. There was increasing awareness that immune mechanisms were responsible for rejection, as suggested by the dog transplants of Morton Simonson in

Denmark and Jim Dempster in London. Jean Hamburger, René Küss and others, in Paris, using a pelvic site, persuaded clinical allografts to survive for up to three weeks, after which rejection destroyed them. Among several unsuccessful clinical series in the early 1950s, those of David Hume, in Boston, were the most instructive. Hume rightly predicted the importance of blood group compatibility and used steroids against rejection. He realised the need for pre- and post-operative management with haemodialysis and reported the first case of disease recurrence in the transplanted kidney. To the surprise of the modern reader, he favoured a femoral site. However, contemporary medical opinion often dismissed these results as insufficient and premature, asserting that successful transplantation would be impossible unless a state of permanent immune tolerance could be induced. Some considered that transplanted organs would be non-viable on physiological grounds, also believing that the pathological and clinical effects of terminal uraemia were in any case irreversible.

The first successful transplants

Then, in 1954, Joseph Murray and John Merrill, in Boston, Massachusetts, performed the first successful living human kidney transplant, between identical twins and with long-term survival. This clinical triumph, for which Murray later received the Nobel Prize, confirmed the technical efficacy of transplantation and its ability to reverse the effects of chronic uraemia. Over the next few years successful identical twin transplants were undertaken in a number of centres, including the UK's first, performed in 1960 by Michael Woodruff, in Edinburgh. But deviation from the

identical relationship, even if slight, invariably led to rejection. Nevertheless, since transplants between close relations usually survived longer than those between unrelated subjects, tests were devised in the hope of identifying suitable donor recipient pairs, including the third-party skin graft and the lymphocyte transfer test – these did not prove useful when applied to patients and their families. Attempts were made to prevent rejection of the graft by whole body irradiation. It was used with allograft bone marrow infusion in both Paris and Boston, but proved too difficult to control. However, sub-lethal radiation achieved modest success in sibling grafts. A search began for immunosuppressive drugs with which it might be combined. In 1959, Robert Schwartz and William Dameshek discovered that the purine analogue 6-mercaptopurine (6-MP) impaired the ability of rabbits to produce antibodies in response to injected foreign protein. Kidney grafts in dogs were protected by 6-MP, despite considerable toxicity. In 1960 René Küss and Marcel Legrain, using 6-MP together with irradiation, reported long-term survival of a kidney donated by the recipient's brother-in-law. In the same year William Goodwin successfully used steroids to control acute rejection. But a high incidence of fatal infection, caused by the loss of immune competence resulting from the need to reverse the rejection process, still deterred optimism. These two formidable enemies – rejection and infection – were to dominate the clinical scene for many years.



Joseph Murray



Joseph Murray carried out the world's first successful kidney transplant in Boston, USA. This portrait was painted by the British transplant surgeon, Sir Roy Calne, November, 1990.

The first well-documented clinical kidney transplant in the UK was carried out in 1955 by Charles Rob and Jim Dempster at St Mary's Hospital, London, on a case of acute renal failure (following septic abortion). It failed; but from 1959 onwards Stanley Peart and colleagues achieved modest graft survivals of thirty to eighty days in some recipients. In the same year, at Leeds General Infirmary, FP Raper, supported by Frank Parsons, started to do 'cadaver' (now 'deceased') donor transplants. One recipient survived for eight months. Previously, in 1957, John Hopewell (whose memoir on early transplantation can be read on the BTS website) had set up a renal unit at the Royal Free Hospital in London, specifically for the treatment of chronic renal failure. In 1958 he was joined in by Roy Calne, whom he helped to begin research at the Royal College of Surgeons experimental farm (Buckston Browne) at Downe, in Kent. This work, which used 6-MP for a series of canine allografts, encouraged them to attempt a number of clinical transplants.



Roy Calne

Of these, one recipient (from a living related donor) survived for seven weeks. In 1960 Roy Calne moved to Boston in the USA to work with Joseph Murray's group as Harkness Fellow at the Harvard Medical School. *En route* to Boston he stopped in New York and visited Gertrude Elion and George Hitchings (who later, in 1988, won the Nobel Prize for their work in drug development). They provided him with a number of purine analogues they had developed as chemotherapeutic agents. One of those compounds was azathioprine. It was a derivative of 6-MP, and, in his opinion, only slightly superior to it. However, he found that it prevented rejection in dogs and was somewhat less toxic. In 1962, in conjunction with Murray, he reported its successful use for a deceased donor transplant in which the kidney had been taken post-mortem from a patient who had died during open-heart surgery. Despite several rejection crises, the organ supported the recipient for two years, after which he received a second transplant.

Calne and Murray's successful use of a deceased donor organ opened new doors for transplantation. During the 1960s, surgeons in the USA and Britain began to transplant these kidneys, using azathioprine and corticosteroids. In most centres at this time, especially in the USA, there remained a preference for living related donors, but a few used deceased donor kidneys almost exclusively. They were helped by the emerging concept of 'brain death', or '*coma dépassé*', as defined by Pierre Mollaret and Maurice Goulon in 1959 and first applied in the Necker hospital in Paris. This allowed assisted ventilation to be withdrawn from deceased donors in an ethical manner. Legal uncertainties regarding the new practices were partly resolved by the Human Tissue Act 1961, which later became the authority for the Organ Donor Card. The development of cold organ perfusion solutions, such as the Collins 'intracellular' preparation in 1969 (which prolonged the viability of a donated kidney for twenty-four hours or more) was another essential step. With more time available, and with maintenance haemodialysis units appearing in many medical centres, planned deceased donor renal transplants were becoming practicable, as was the elective selection of recipients on the basis of blood group and HLA compatibility.

HLA compatibility testing had been introduced into clinical practice in the early 1960s, following Jean Dausset's discovery of the MAC antigen, later re-named HLA-2. In 1965, Johannes ('Jon') van Rood's group, in the Netherlands, and Paul Terasaki's group, in the USA, both proposed leucocyte HLA antigen matching as tests for selection, based on the knowledge that these antigens reside in the leucocyte cell membrane and that HLA-A and HLA-B had been identified as part of the major histocompatibility complex in man. With the discovery that some pregnancies lead to formation of specific anti-HLA antibodies, a source of reagents for matching recipients and prospective donors became available. The need to conserve precious monospecific sera led to the introduction of the microlymphocytotoxicity test by Terasaki and John McClelland in 1964. Another method was the mixed lymphocyte culture test (Fritz Bach and Nancy Voynow, 1966). This was performed by mixing the lymphocytes of the recipient (the responding cells) with those of the proposed donor (the stimulating cells), which had been pre-treated with mitomycin-C to make them inert. The mixed lymphocytes were then incubated with radioactive thymidine, the degree of uptake providing an assay. As the test took at least three days to perform, it was effectively limited to living donors.

The late 1960s and early 1970s saw progress in both forms of renal transplantation. Azathioprine was by no means risk-free, but, when combined, in lower dose, with steroids, it became safer. This had been demonstrated by Thomas Starzl in the USA. Success rates improved, but there were many disappointments, due to the infectious complications and mortality rates of high-dose steroid maintenance regimes, which had to be further increased in the event of acute rejection. The clinical use of a polyclonal antilymphocyte serum (ALS) by Starzl, in 1967, was a step towards more selective methods. Its potential in organ grafting had first been investigated by Michael Woodruff, in Edinburgh.

The 'Belfast Regime'

In 1968 Mary G McGeown and colleagues devised the 'Belfast Regime', intended to reduce mortality by use of low-dose maintenance steroids, intensive isolation methods and a commitment to return to dialysis all recipients whose grafts had failed. This regime, which included bilateral nephrectomy in many patients, as well as much pre-transplant blood transfusion, had by 1975 achieved five-year cumulative graft survival rates approaching eighty percent, with a strikingly low infective mortality. Such improved clinical practice showed that high-dose regimes were not essential to success and pointed the way towards transplantation as a routine procedure. Peter Morris, in Oxford, developed a similarly successful protocol in the mid-1970s. The discovery that minimal immunosuppression could keep a graft in good condition over a long period of time encouraged the later development of regimes designed to induce a clinical state of '*prope-tolerance*'.

The kidney had clear advantages as a transplantable body part. First, since a single kidney sufficed to maintain health in a living donor, the second could be removed for transplantation without excessive risk. Second, provided urinary drainage could be



Mollie McGeown



Oxford Transplant Unit and Renal Ward opened by Sir Peter Medawar, August 21 1977. L TO R: Dr Desmond Oliver, Sir Richard Doll, Professor Peter Morris, Sir Peter Medawar, Lady Jean Medawar.

PHOTO COURTESY OF PROFESSOR CHRIS WINEARLS

established, its placement in the recipient was relatively straightforward and permitted some flexibility. Third, the availability of dialysis reduced clinical urgency, allowed pre- and post-operative support and provided an escape route in the event of failure. Nevertheless, attempts to transplant other organs had been made. Corneal grafts were in a separate, relatively well-tried category, due to their lesser dependence on tissue compatibility.



The first liver transplant, Denver, USA, 1963

PHOTO SANDOZ LABORATORIES

By 1963 Starzl, in Denver, had shown the feasibility of liver transplantation. He had some early success, using azathioprine, actinomycin C and steroids, but survival was disappointing, mainly because of septicaemia and other systemic infections related to complications of graft biliary drainage. Lung, pancreas and intestinal transplantation had achieved even less success. In 1968 the first liver transplant outside of the USA was performed by Roy Calne in Cambridge; but liver transplantation remained for some time a high-risk procedure, with formidable morbidity and mortality.



Tom Starzl

In 1963, in Jackson, Mississippi, James Hardy performed the world's first lung transplant, from what would now be recognised as a DCD (a donation after circulatory death). The patient, a life-sentence prisoner, died of renal failure after eighteen days. Over the next few years, twenty-three lung transplants were carried out around the world. In 1968 the first in the UK was performed by Andrew Logan in Edinburgh. Michael Woodruff was closely involved. Another lung transplant was done at Guys Hospital by Donald Ross a year later. However, apart from a single patient in Belgium who survived for ten months, all recipients died shortly after transplantation, probably from rejection.

In 1967, in Cape Town, Christiaan Barnard performed the first initially successful heart transplant, using techniques pioneered by Norman Shumway and Richard Lower in the USA. The death of the recipient after nineteen days (from infection) and the disappointing outcome of a subsequent planet-wide cardiac 'transplant frenzy' (to paraphrase René Küss) which resulted in a sixty percent failure rate in less than a year, overshadowed the few long-term successes, which included those of Richard Lower, Deward Lepley and Dudley Johnson in the USA, and of Edmond Henry and Jean-Raoul Monties, in Marseille. The first in the UK, performed by Donald Ross in May 1968, was the tenth in the world but with only short-term survival.



Christiaan Barnard



Donald (second from right) interviewed after the UK's first heart transplant

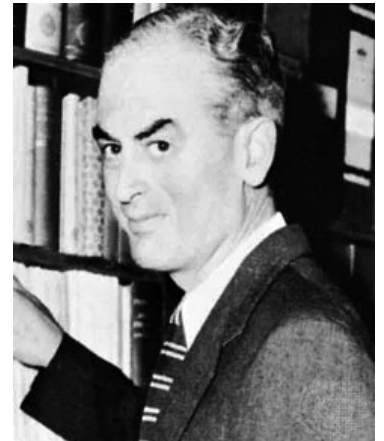
The formation of the British Transplantation Society (BTS)

By the start of the 1970s, although hope for progress with other major organs remained high, only kidney transplantation, despite many difficulties, had become established as a clinically effective treatment for end-stage renal failure. By 1971, doctors in the London area (mainly with a renal interest) were meeting regularly to share experiences and discuss problems, especially in the field of HLA compatibility testing. These informal meetings, organised by John Hopewell from the Royal Free Hospital, developed into the London Transplant Club. Surgeons began to co-operate by sharing deceased donor kidneys, those centres not actively engaged in transplantation contributing suitable patients with near-terminal renal failure.

Methods for perfusion and rapid cooling of kidneys were well established and, within the London area, the transfer of organs between donor and recipient centres, in a sterile slush of preservation fluid, was easily arranged. In the following year (1972) Belfast joined the Club, contributing and receiving many of its kidneys by emergency flights of the St John Ambulance Air Wing.

Although some progress had been made in HLA typing, most transplantation was based on ABO matching or compatibility. But in the London area several immunologists (among them Hilliard Festenstein, Richard Batchelor, and Walter Bodmer) were actively working on the leucocyte antigens. Their material was frequently reported to the British Society of Immunology (BSI). The international Transplantation Society had emerged some years earlier from meetings on histocompatibility and human allografts at the New York Academy of Sciences; and in 1966 a first International Congress of Transplantation had been held.

At a meeting of the London Transplant Club on September 28 1971, the need for a similar organisation in the UK was discussed. John Hopewell received many supportive letters and sent a circular letter to those he thought might be interested in forming a society. Support was widespread, from physicians as well as from surgeons and immunologists, although some dissenting voices were heard - one writer considered that 'British Association of Organ Replacement' would be a less emotive title. After further discussion at a meeting of the BSI on October 20 1971, Roy Calne wrote to John Hopewell that its members, almost all immunologists (and including Hilliard Festenstein, Richard Batchelor, and Walter Bodmer) wished to set up a combined transplantation and immunology society. Upon suggestions that this new society's meetings (or some of them) might precede or follow those of the immunological society, which drew attendance from all over the British Isles and Europe, the BSI formed an *ad hoc* committee to plan two, mainly immunological, meetings per year, plus two more, possibly in the provinces, which would be clinically orientated.



Sir Peter Medawar, first chairman of the BTS

On April 12 1972 an inaugural meeting was held at the Royal Free Hospital, at which about eighty persons were present. Professor Sir Peter Medawar was invited to take the chair. A steering committee was set up, with Sir Peter as Chairman, which included the members of the *ad hoc* committee, the BSI having two representatives. The meeting also established the Constitution Committee, and elected office bearers and committee members. Sir Peter was elected Chairman, Dr Leslie Brent General Secretary, Mr Anthony Barnes Meetings Secretary and Mr John Hopewell Treasurer.

It was eventually decided that the spring and autumn meetings should be associated with the BSI, and that there should be at least one other meeting, preferably outside London, each year. The Wellcome Foundation offered a meeting place and hospitality. The BSI provided temporary funds, as well as the use of its secretariat. Seven papers were presented at the second meeting, on October 18 1972, at the Wellcome Foundation. These were already separated into scientific and clinical sessions. Appropriately, Sir Peter Medawar led on 'the contribution of transplantation

biology to immunology and experimental biology'. Further papers covered rejection of the mouse small intestine, polymorphisms at the MLR locus in pigs and the human foetus as an allograft. Clinical papers discussed the leucocyte migration test in the diagnosis of early rejection, the outcome of one hundred renal transplants and (from the team of Geoffrey Chisholm, Ralph Shackman and Keith Peters) the concept of 'transplantation without regular dialysis'.



Pierre Grabar

Professor Pierre Grabar, a pioneer of immunology and Founding President of the French Society of Immunology, was elected the first senior member. For the first three months after the society's inauguration, founder membership applications required approval by the Committee. At this time there were 202 such members, including one Fellow of the Institute of Laboratory Technicians. New members were to be proposed and seconded by existing members, scrutinised by the Committee and elected at the next Annual General Meeting of the society. At the second meeting in October provision was made for honorary membership to be given to distinguished individuals who had contributed significantly to knowledge of transplantation. In 1972 George Davis Snell was elected the first honorary member. In 1980 he

shared the Nobel Prize for Physiology with Baruj Benacerraf and Jean Dausset, both also much respected by the Society. Twenty-eight honorary memberships had been awarded by the society's fiftieth anniversary.

The first constitution laid out three main aims for the society. It would:

- a Advance the study of the biological and clinical problems of tissue and organ transplantation;
 - b Facilitate contact between persons interested in transplantation; and
 - c Make new knowledge available to any person for the good of the community.
- It might also concern itself with the social implications of transplantation.

These original aims remain essentially the same. In the early 1980s, under Robert Sells, the Chairman's title was changed to President and the Committee's to Council, which was considered to better reflect their respective executive positions.

Until the end of the 1970s three meetings were held annually. As it transpired, the Spring meeting generally came to be in the provinces and the others in London. About half the London meetings were held at the Wellcome Institute and the rest in hospitals, the Royal Free Hospital often offering facilities. The first international joint meeting was held with the French Transplantation Society at the Wellcome Institute on April 21 1976. The first national joint meeting was held with the British Societies for Immunology and for Allergy and Clinical Immunology at Liverpool University on July 14 1976. Many more joint meetings or congresses have taken place. In total there have been four with the British Society of Immunology, four with the British Renal Association (and once also with its Netherlands counterpart), two with NHS Blood and Transplant (NHSBT) two each with the French and Netherlands Transplantation

Societies and one each with the Eurotransplant Foundation, the British Society for Histocompatibility and Immunogenetics and the British Society for Allergy and Clinical Immunology. These joint meetings usually lasted for more than a single day and consisted of a series of symposia, some combined and some of special interest to one or other of the societies. Each BTS meeting included at least one invited lecture by an eminent authority on some aspect of transplantation or immunology. From 1981 two meetings were held each year, mainly in university hospitals or at the Royal Colleges of Physicians or Surgeons. Between twenty and thirty oral presentations were delivered at each meeting, except at combined meetings, where the interests of the joint society (especially the BSI) could greatly increase these, many presented as posters.

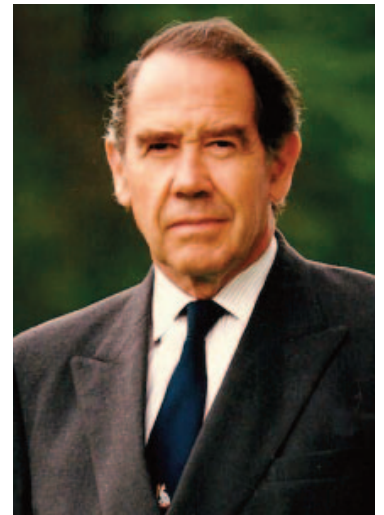
The history of transplantation since the inauguration of the BTS is too extensive and involves too many fields of specialist expertise to be fully summarised here. The following are some of the developments of most interest to the BTS in its first twenty-five years, as judged by over 1,100 papers presented at meetings up to 1998. In kidney transplantation, led by regimes such as those of McGeown and Morris, methods of improving outcomes and reducing complications were developed. Knowledge of HLA compatibility was expanded. In 1978 Alan Ting and Peter Morris applied HLA-DR matching to clinical transplantation, with significant effects on graft survival. Following the work of Gerhard Opelz, in Heidelberg, through the Collaborative Transplant Study (CTS), which he initiated in 1982, the potentially beneficial, and possibly tolerance-inducing, effects of blood transfusion were much discussed. Longer term CTS data increasingly confirmed the importance of HLA histocompatibility matching to graft survival. The problems of organ donation, retrieval and sharing also received attention and there was increasing awareness of the pitfalls inherent in the public perception of brain-stem death and beating-heart donation, which came to a head in 1980, after the notorious BBC 'Panorama' presentation, 'Are the Donors Really Dead?'

One of the greatest clinical advances of this period was the introduction of cyclosporin. Its potential had been revealed by Jean Borel in 1976 and it was first successfully used by Roy Calne in 1978. In the 1980s, many BTS papers charted its role in improving renal transplant outcomes and reducing steroid toxicity. Heart transplantation also benefited significantly. Having abandoned the operation in the 1970s, Shumway in the USA, and others, after making technical improvements, began to achieve results comparable to those for kidneys, in spite of cyclosporin's disturbing nephrotoxicity. In 1979 Terence English performed the first successful heart transplant in the UK and this achievement was followed by an expansion which led to the eventual establishment of six recognised and centrally funded centres for adult transplants, with children treated at Great Ormond Street and Newcastle.



Roger Williams

Improvements in the assessment of patients with liver disease, led in the UK by Sheila Sherlock, Roger Williams and Elwyn Elias, combined with better donor and organ



Sir Terence English

care, saw a renaissance in liver transplantation, headed by Roy Calne and others. Since liver transplantation became a nationally commissioned service across the UK, over 20,000 liver transplants have been performed at an average rate of 900 *per annum*. There are now seven UK centres (plus one in Ireland) which have contributed to the world-wide development of the discipline. As results improved among adults, attention focused on techniques to treat children with chronic liver disease. Split liver techniques (*in vivo* or *ex vivo*) were an important advance, allowing the transplantation of many children. In 1989, in Chicago, the first such living donor liver transplant was performed, from a mother to her small daughter. Today many deceased donor livers are split to permit preferential access for children, the remaining larger part of the liver remaining suitable for adult implantation. Adult liver donation, auxiliary transplantation, non-heart-beating donation and cell transplantation were also developed as alternatives to the still limited availability of deceased organs.

The first truly successful lung transplant, performed in 1983 by Joel Cooper and colleagues, of the Toronto Lung Transplant Group, also resulted from improvements in surgical techniques and the new immunosuppressive agents. In 1981, in Stanford, Bruce Reitz had achieved the first long-term survival in combined heart and lung transplantation. In 1984 John Wallwork, at Papworth Hospital, was the first in the UK to repeat this success. Heart and lung transplants were at first widely used, but over time were supplanted by isolated lung transplants. In 1987 the first successful single lung transplant in Europe was performed by Christopher McGregor, leading the group at Freeman hospital in Newcastle. In 1990 this hospital



John Dark

was the first to introduce bilateral lung transplantation, performed by John Dark, and later, in 2002, the first to carry out a lung transplant from a DCD donor. Combined heart and lung transplants are now restricted to those who have irreversible failure of both organs. Living donor lung lobe transplants also became possible. In 1996 Vaughn Stames, in the USA, reported on the first successful cases. The overall outcomes of lung transplantation have much improved, but long-term survival rates have not been as good as for kidneys, livers or hearts.

Pancreas transplantation, which had first been performed in 1966 by William Kelly and Richard Lillehei at the University of Minnesota, had at first little success, but in the 1980s, following the introduction of cyclosporin and improved surgical techniques, outcomes began to improve and transplantation became an important option for diabetic patients, particularly those with advanced nephropathy due to type I diabetes. In 2004 pancreatic transplantation became a nationally commissioned service, with eight centres now performing pancreas transplants on a regular basis. Over 2,000 have been performed at an average rate of 150 *per annum*. Although simultaneous kidney and pancreas transplantation has been the most effective and most performed procedure, implantation of the pancreas alone, as well as infusion of pancreatic islet cells, have both found a role in suitable recipients. In 2012 islet transplantation was

commissioned nationally, through five centres. Almost 500 transplants have been performed at an average of forty-five *per annum*.

Intestinal transplants, previously impracticable, improved in outcome following the generally accepted first successful procedure by E Deltz, in Germany, in 1988, again largely aided by advances in both surgery and immunosuppression. Special techniques, sometimes also involving multiple transplants, including the liver, were developed for a variety of conditions, especially paediatric, with satisfactory results. The same principles later led to the transplantation of other body parts, such as the uterus, upper limbs and even the face, which would formerly have been considered unachievable.

On the basic science front, the mechanisms of ischaemia and reperfusion injury were increasingly revealed, along with the limits for deceased donation which they suggested. The role of complement in rejection was recognised and the discovery of regulatory T cells rekindled efforts to understand and induce experimental and clinical tolerance. Tolerance was also studied through the concept of microchimaerism, proposed as the cause of the relative protection induced by successful liver transplantation. Solid-phase and flow cytometry improved the performance of histocompatibility testing. DNA sequencing enhanced rapid HLA typing accuracy. Finally, the introduction of stem cell technology to transplantation science opened another door through which the elusive goal of induced tolerance might be glimpsed. This was the dream of the first transplanters. Recent researches, which suggest that tolerance is not a perfect 'once-for-all' state of the body, but rather an incomplete, imperfect and temporally variable summation of central and peripheral processes, give hope that antirejection regimes may eventually approximate sufficiently closely to it to become equally effective.

The success of cyclosporin, and of later agents (such as tacrolimus, mycophenolate, rapamycin and chimaeric monoclonal antibodies) allowed organ transplantation to become, at last, an accepted procedure, available in thousands of centres throughout the world. As the millennium approached, it became clear that the balance of benefit against risk, in kidney transplantation, was swinging in favour of living donation, including unrelated living donation, whose results, reversing the predictions of the previous decade, now significantly bettered those from deceased donors and equalled some forms of related donation. But as success rates increased, so did the desirability of organs, which some continued to see, not as a 'gift of life', but as an opening for the operation of market forces. Although most countries, including the United Kingdom, have transplant laws banning commercial donation, illegal marketing persists and international efforts to minimise illicit donation and transplantation activity are on-going. While the evils of 'organ trafficking' have been widely exposed, there is some support for the concept of regulated compensated donation.

On October 14 and 15 1997 the society held its 25th anniversary meeting at the Royal Society in London, with an unusually large number of guest speakers and a celebratory dinner at the Merchant Taylor's Hall, attended by many past presidents.

This was the last of the 'old style' meetings. From 1998 a single three-day annual Congress was introduced by the Council, the first being held at Dublin Castle Conference Centre from April 1 to April 3 of that year, at which seventy papers were presented, as well as twenty posters. There is no record of posters at any previous meetings of the BTS alone. The Congress has since gradually developed its present form, which has proved popular. It now consists of both plenary and parallel sessions, to allow space for general and specialised subjects. Clinical Transplantation, Immunology and Basic Science are always included. As far as possible, all aspects of transplantation receive regular representation. Most sessions contain lectures by invited speakers, often BTS members, who are domestic or international leaders in their fields. In keeping with the society's objectives, it is usual to include sessions on organ donation and procurement, transplant co-ordination, ethics and patient-related issues.



The Second Annual Congress, Edinburgh, 1999

A plenary session is reserved for young members competing for the Medawar Medal, awarded to perpetuate the memory of Sir Peter Medawar, Nobel laureate and founder Chairman of the BTS. It was first presented in 1990. In 2007, because of the difficulties of comparing work in different disciplines, it was decided that two medals would be awarded annually, for clinical and basic science presentations respectively. In the light of this decision it is interesting to recall the exhortation of Meetings Secretary Roger Blamey before the autumn meeting of 1978: 'Speakers are reminded both of the need for papers in complex subjects to be understood by members in all disciplines relating to transplantation and of the need for clear slides. Chairmen will be encouraged to rebuke, halt and, if necessary, precis speakers'. How far this counsel has been followed is a matter of opinion; but it has a strong mandate in the Society's expressed constitutional aims. Congress presentations are selected by an abstract committee, which also selects an increasing number of posters.

The Roy Calne Award, first made in 1995 (before which it was the Young Investigators Award), honours Sir Roy's contributions to the science and surgery of transplantation. It is presented for outstanding publications in recognised academic journals. Since 2016 the Calne-Williams Medal, for presentations involving the liver, has also been awarded. Two further recent awards are the Herrick Award, for the best presentation by a trainee surgeon, and a similar award for nurses and allied health workers. Many of these awards have become possible because of the financial support (since 1982) of Corporate Members (now Partners) and the attainment (in 1988) of charitable status.

Pre-congress symposia were introduced in 2006, a move which emphasises the importance of the single meeting, as well as the diversity of subjects and specialties which exist to promote transplantation. All members can attend the Annual General Meeting during the Congress, and a Council meeting is also held. Members and other participants have the opportunity to meet and converse on what they will do at company exhibitions and social events. In addition to the main meetings and congresses, educational 'Summer Schools', at rotating venues, were held over many years. These were later replaced by more occasional subject-specific meetings. In recent years, two regular meetings of importance have been the Winter Ethics Symposium and the Living Donor Forum, often combined into a two-day event.

Throughout the history of the BTS, working groups and temporary sub-committees have been set up by the Society on various occasions to investigate particular issues or to resolve problems. For example, in 1980, the so-called 'centre effect' (the emergence of significant variations in renal transplant outcome between centres) led to an investigation and visitations by a BTS team, dubbed the 'Three Wise Men'. The Wise Men considered the effect to be caused by differing incidences of acute rejection and death with a functioning graft. Pre-transplant blood transfusion, the introduction of cyclosporin and strict post-operative management policies were associated with the more successful centres, although these factors did not fully explain the effect. The Wise Men reported at the end of the azathioprine era. A second investigation, in 1989-90, still showed unexplained variation, but, with near-universal use of cyclosporin, outcomes had improved in most centres.



Liver transplant:
The Moment of Truth
Painting by Roy Calne

At first, working groups and sub-committees were always set up by the BTS Committee, but the Council later encouraged individual members to set up forums for specific purposes. These have the support of the BTS, provided that they comply with certain rules and report to the Council. Several sub-committees have become permanent, due to the importance of the matters they deal with. In 1986, following publication by the BTS of its '*Recommendations concerning the use of living unrelated donors in the United Kingdom*', a Supervisory Committee on Organ Transplantation was created. The 1980s were a time of improving transplant outcomes. Many were becoming aware that even poorly matched living kidney donations could produce excellent results, with a quality and

duration of survival unobtainable by dialysis, and that a pool of potential donors might be found, through 'market forces', to eliminate the prolonged, possibly fruitless, wait for a deceased donor kidney. The BTS was concerned that all living donation must follow ethical principles, be non-exploitative and remain wholly altruistic. The

Supervisory Committee acted as an informal referee in such cases, some of which raised complex issues of motive, relationship and medical authority. Representative members lobbied the Department of Health, the General Medical Council and the British Medical Association, advocating compulsory registration of living donations. Although the USA had passed a transplant law in 1984, Westminster was slow to respond until the exposure of unethical practices in a London clinic in 1989 prompted the rapid passage of the Human Organs Transplants (HOT) Act 1989. The HOT Act, which made commercial transplantation a crime, put some of the Supervisory Committee's recommendations into effect, but in addition transferred the decision on unrelated living donations to a statutory regulatory body (ULTRA). ULTRA was later superseded by the Human Tissue Act 2004 and the Human Tissue (Scotland) Act 2006. These continued the ban on commercial practices, imposed strict regulation of living donation and required express consent (or authorisation) for all deceased donations. Recent 'deemed consent' legislation, however, has significantly changed the requirements for consent.

In retrospect, despite its ethical motivation, the Supervisory Committee's recommendations on living donation (published in the British Medical Journal in 1986) now appear very cautious. The committee preferred deceased to living donation, which it considered to be justifiable only in exceptional circumstances. Living unrelated donation was deemed acceptable only at the request of spouses or very close friends, after at least six months on the deceased donor transplant waiting list. In 1987 the committee appeared to approve a Council of Europe ruling that 'Removal of organs from living donors should be restricted and, where possible, gradually eliminated'. This is far from the present BTS guidelines on living donor transplantation, which recommend all forms of living kidney donation (including paired, pooled and non-directed altruistic donations), as a treatment of choice, on the grounds of its superior outcome and ability to pre-empt the need for dialysis in renal failure. This reversal of opinion stems, in part, from clinical experience based on scientific advances, but also reflects changes in ethical emphasis brought about by the successful outcomes themselves, as well as by the continued widespread shortage of donor organs.

After 1989 the Supervisory Committee underwent a metamorphosis into the present Ethics Committee, which has an important role in the Society. The evolution of transplantation raises complex ethical and legal questions created by new clinical and scientific advances and this process is likely to continue. The Ethics Committee is responsible for considering such issues and for assisting the BTS to have an agreed position on them. They are often controversial, engendering much debate at ethics sessions. Since 2010, these have been enhanced by the annual Hoffenberg Lecture, inaugurated in honour of Professor Sir Raymond ('Bill') Hoffenberg (1923–2007), a former President of the Royal College of Physicians, whose many interests included ethical problems in transplantation. The Ethics Committee has produced position statements and comments on many of these problems, which are available on the BTS website. It has also arranged a series of Winter Ethics Forums at which important contemporary ethical issues can be presented and debated.



Robert Sells inaugurated the Hoffenberg Lecture

The Standards Committee appeared in 1998, under the presidency and direction of Bob Johnson, at a time when outcomes were uniformly improving, with little significant variation between centres. Nevertheless, partly in response to discrepancies in outcomes such as those revealed by the inquiry into children's heart surgery at Bristol Royal Infirmary, there was concern that best practice in transplantation should be seen to be uniform throughout the country. In addition, a government-supported campaign for 'evidence-based medicine' was underway which, although somewhat invidious to a society dedicated to scientifically-based progress, was in keeping with public opinion, which now perceived transplantation as an established, rather than an exceptional, treatment. Members in general welcomed the drawing up of BTS guidelines, both as a source of reliable information and as a form of protection against criticism. The first guidelines, since updated several times, appeared in 1998 and have been followed by many more. They have been well received, nationally and internationally, a tribute to the immense amount of work done by this committee, sometimes in association with other societies, and have gained recognition from the National Institute for Health Care Excellence (NICE). They are readily available on the BTS website. It is important to realise that, while authoritative, guidelines are only a guide to best practice, do not have the force of law, cannot be a substitute for individualised treatment and are liable to become out-of-date with time. The Committee regularly reviews them all to ensure that they are up-to-date, accurate, relevant and easily accessible.

The Transplant Training and Education Committee (TTEC), another longstanding body, reported regularly to the Council. One of its main functions was to advise on the career structures of young transplant surgeons and to promote recruitment into the discipline. Transplant surgery at first developed in a piecemeal fashion, often resulting from the individual efforts and enthusiasm of researchers and their assistants. These arrangements could not survive the modern expansion of transplantation. Some transplant surgeons developed their skills as an extension of existing specialties, such as urology, or cardiac and thoracic surgery, but other trainees had more diverse backgrounds. Despite clinical and academic attractions, a crisis in recruitment emerged during the 1990s and early 2000s, whose resolution involved input from the TTEC. More recently, training in transplant nephrology and other non-surgical fields has become an issue. From 2014, the TTEC began to meet jointly with another BTS group, the Chapter of Surgeons. It is now called the Education Committee.

The Clinical Trials and Research Committee is responsible for identifying, organising, co-ordinating and encouraging clinical trials in transplantation. It also has a role in promoting outstanding clinical transplantation research in the UK. It identifies areas in which trials are required, provides a forum for their development, engages UK transplant centres in a high quality research network, organises and co-ordinates all aspects of clinical trials, and reports on their progress. The work of this important committee is at the heart of the society's philosophy.

The Congress Organising Committee arranges the annual congress and may include both Council members and local organisers. It also provides the abstract and

award committees associated with the congress programmes. The Council Executive sits in committee to award research fellowships, travelling fellowships and bursaries. These fellowships are of considerable value. Their main purpose is to fulfil the aim of advancing the study of transplantation, but they also encourage active membership of the BTS.

Special mention should be made of the St John Ambulance Air Wing Travelling Fellowships in Transplantation. The Air Wing was formed in February 1972 in order to provide a volunteer air service to fly transplant organs, drugs, blood supplies and even patients to the appropriate destinations in emergency situations when no other means were available. Although organ transport became the Air Wing’s main activity, any mission within the scope and ideals of St John Ambulance Association could be undertaken. Its value was quickly recognised. By 1973 the majority of flights involved the transport of kidneys for transplantation. Following a call to the Flight Control Centre in Epping, a plane could usually be airborne within one hour. For nearly twenty years an army of over 100 volunteer pilots, organised in groups throughout the country, offered their time, skill and courage to ensure the timely delivery of organs in circumstances which could be difficult, dramatic or even dangerous – sometimes all three. From the late 1970s livers and hearts were also transported, along with the necessary retrieval teams for these organs. Many tales of the good will, daring and resourcefulness of the Air Wing pilots were told, much appreciated by the transplant teams and, not least, by recipients, some of whom

were known to boast of the way in which their organs had arrived and of the prominent people who had flown them in. This heart-warming period of organ transfer ceased in the early 1990s, when the advent of specialist organ retrieval teams and the development of improved preservation methods ended the need for so much reliance on the Air Wing. A Travelling Fellowship in memory of the Wing was then set up by Mr Andrew Paris, a consultant urologist at the London Hospital, who was associated with St John Ambulance and the earliest mercy flights. Its purpose was to enable Fellows to visit other transplant centres in the United Kingdom or abroad in order to widen their knowledge and experience. In 2021, following



Andrew Paris

his death, a generous legacy was offered to the BTS to be used in Andrew Paris’s memory. New proposals to continue the bursary fund and support guideline development for the benefit of BTS members were endorsed by his widow prior to launching at the 50th Anniversary Congress in 2022.



Start of a St John Ambulance Air Wing flight at Plymouth, 1973. WEST OF ENGLAND NEWSPAPERS LTD



Pat Pattison and Bob Paterson, who flew the first UKTP organ donation flight, loading up a kidney. From *On a Wing and a Prayer, The Story of the St John Ambulance Air Wing*, by Norman Franks



Stamp commemorating St John Ambulance, 1887–1987. Transplant organ flights lasted from 1972 until 1992.

The BTS in the twenty-first century

By the year 2000, the BTS was in a healthy state, with a growing, varied and active membership, which could point both to increasing clinical success and to significant scientific achievement, although some disciplines (eg cardiac transplantation) were less represented than might have been wished. Nevertheless, it still displayed evidence of its informal origin in the early years of transplantation. This had advantages, but could become an embarrassment, even a danger, in the twenty-first century world. The Society's growth required more administration, as well as a professional secretariat (in earlier years, help from the BSI and hospital staff had sufficed). The diverse interests of more recent membership groups required a voice. Communication, which from 1993 had been made via the BTS newsletter, now relied on electronic contact. The BTS website, which began in the late 1990s, was professionally reorganised in 2001, by which time the first newsletters had ceased publication. It has since undergone further reorganisations, most recently in 2022, and now contains all the membership bulletins and newsletters, as well as details of almost all the society activities covered in this history.

The annual Congress was getting more ambitious (it was beginning to use conference centres rather than university facilities) but also more costly. Risk analysis suggested that serious liabilities might fall on the BTS executive and membership in the event of unexpected interferences with society activities. Perception of the BTS as 'The Voice of British Transplantation' required a readiness to respond on its behalf, particularly to the media. The disclosures regarding unauthorised tissue retention which led to the Human Tissue Act 2004, although not directly involving organ donation, were nevertheless likely to bring it under greater public scrutiny. Issues of consent to donation, and to medical treatment in general, were becoming more complex and more controversial. Human Rights legislation was another possible source of difficulty. The widening scope of transplantation raised ethical issues, while the continuing shortage of donor organs and the means of overcoming it was an ever-present concern.

In 2003, with Philip Dyer as president, the BTS became a charitable company limited by guarantee. The resulting security has been gained at the expense of new statutory duties and enlarged executive powers. The AGM, as well as Council and Executive meetings, must now comply with the Companies Acts. Four Trustees (President, Vice-President, Treasurer and Secretary) may, while in office, exercise all the society's powers, including spending funds on its behalf and making contracts, without requiring Council approval. To avoid gaps in executive experience, the President now serves for two years only, after an 'easing-in' for two years as Vice-President. In 2006, under the presidency of John Forsythe, with the approval of the society, and after a review of its 'constituent parts', arrangements were made for all membership groups to be adequately represented on the Council. This has provided a voice for important professional groups, particularly those involved with nursing, transplant co-ordination and organ donation, whose influence in the society has

increased and can be seen in many of its activities. In a further review of representation for liver, heart and lung during the later presidency of Derek Manas, heart and lung transplantation were separated and representatives of hepatology and liver surgery were added to the Council. These alterations, like the earlier changes, were made in order to improve representation for organ-specific constituents of the society and to increase inclusivity’.

As a result of these changes, the BTS can with some reason claim to be, as stated on its website, and in the opening paragraph of this history, the professional voice of transplantation in the UK and the only society that represents all those working in the transplantation specialty.

The powers and duties of the Trustees are set out under the Company’s Articles of Association and those of the Council, and of its component parts and membership under the Society’s Rules, which include sections on meetings, Council elections and other important matters. At present, they provide for the Council to be made up as follows:

- 1 The President and Vice-President (both two-year terms), the Secretary (three years) and the Treasurer (four years);
- 2 Chairs of the Sub-Committees, notably Standards, Ethics, Clinical Trials and Research, Education (all elected for three years) and of the Nominations Committee, which nominates consultant members for clinical excellence awards;
- 3 Elected Councillors for: Transplant Surgery, Transplant Nephrology, Liver Transplantation, Cardiac Transplantation, Pulmonary Transplantation, Hepatology, Transplant Science, Histocompatibility, Organ Retrieval, Donor Transplant Co-ordination and Recipient Co-ordination and Nursing.

The Council also includes the Chairman of the Chapter of Surgeons, the Chairman of the Herrick Society, a representative of NHSBT, a media consultant and the archivist. Many of these Committees and Councillor posts have existed for many years. Others are more recent or have changed over time.

Nursing, always indispensable, is now represented (since 2013) by the Chapter of Nurses. In 2021, Alison (Lisa) Burnapp, a consultant nurse with extensive experience of all aspects of renal transplantation, became the BTS’s first President from a professional nursing background. Transplant co-ordinators, who first appeared in the 1980s, at a time when organ retrievals and donation procedures were somewhat haphazard, quickly became essential. It was said that, when they were first appointed, transplant directors were prone to ask, ‘What will we do with them?’ Six months later, they were asking, ‘What would we do without them?’ The importance of transplant co-ordinators and other professionals contributing to the donation process has

become increasingly clear in the past twenty years, most notably in the implementation of the report of the Taskforce on Organ Donation in 2008, which led to a fifty percent increase in deceased donation by 2013. Co-ordinators, as well as the Specialist Nurses for Organ Donation (SNODS), who were brought into being following the Taskforce's recommendations, are represented by Councillors and on the Chapter of Nurses.

The Herrick Society (formerly the Carrel Club), a forum for trainee surgeons, has been associated with the BTS for many years as an affiliated organisation. Its present name, adopted in 2019, commemorates the first recipient of a successful living donor kidney transplant and is considered more appropriate to the modern era. The Chapter of Transplant Surgeons, which has annual meetings, is a forum for all surgical members of the society. Working closely with the Education Committee and Herrick Society, it provides a professional voice for transplant surgeons within the United Kingdom and identifies matters which are of importance to their unique working patterns.

Corporate Members (now known as Corporate Partners) were first appointed in 1982. In return for invaluable financial support, which includes sponsorship of research fellowships, the annual Congress and stand alone meetings, they enjoy a number of advantages, two of the most important being the right to a privileged plenary symposium at the annual congress and access to the BTS Executive. The Society Rules also provide for Associate and International Associate Membership, which both confer some privileges but no voting rights. In keeping with its philosophy, the BTS has developed ties with other professional bodies interested in transplantation, which can involve affiliation. Among them are (from 2013) the Solid Organ Transplant Pharmacy Association (SOTPA) and (from 2017) the British Urology Transplant Society (BUTS). It is also a member of the Kidney Quality Improvement Partnership (KQuIP) which was launched in 2016 to promote quality improvement in kidney services. It has links to many other societies interested in transplantation, as well as to NHSBT, with which it has shared two recent combined congresses. It supports government-backed initiatives such as *Organ Donation and Transplantation 2030: Meeting the Need*, launched in June 2021, whose key aims are to increase consent rates to donation and to make the best use of donated organs. This is the first time that deceased and living organ donation have been brought together into one strategy. It follows two previous strategies, *Taking Organ Transplantation to 2020* and *Living Donor Kidney Transplantation 2020*, which were launched in 2013 and 2014 respectively and also had BTS support.



Audience at the Tenth Annual Congress, Manchester, 2007
COURTESY OF PROFESSOR PHIL DYER

To judge by membership, the society is flourishing. There were over 800 members in 2021, compared to 202 at its foundation, and these figures have remained fairly stable over recent decades. The benefits of membership include reduced Congress and meetings fees, access to other BTS members via communication and the e-newsletter and access to the Transplant Library, a UK non-profit organisation founded in 2005 by Sir Peter Morris. Members may also be eligible for educational bursaries and



The Calne-Williams Medal award, 2017
L to R: Sir Roy Calne, Carlo Ceresa
(winner), Derek Manas, Krishna Menon
and Roger Williams

research fellowships, as well as for reduced membership fees to other societies – currently to the European Society for Organ Transplantation (ESOT).

The number and variety of abstracts, presentations and posters have increased significantly in the twenty-first century. Up to 1998 (the year of the first annual Congress) there had been approximately 1,150 oral presentations, as noted by abstracts

(about forty-five per year). By 2021 there had been a further 1,600 (about sixty-five per year) making a total of around 2,750. Prior to 1998, there had been no posters at meetings held by the BTS alone, and in that year only twenty. However, by 2021 posters had risen to a total of 3,360, overtaking the sum of all oral presentations from the society's foundation, and averaging 140 per year, with record numbers at more recent congresses.

As in presentations at early BTS meetings, the topics now being addressed have tended to reflect the matters of greatest current interest and concern. Although outcomes, complications, medical treatments, rejection, and laboratory studies, particularly those related to transplantation immunology and tolerance, prominent in earlier BTS meetings, have continued to be discussed in more recent congresses, there have been changes of emphasis. Rejection and tolerance have featured less strongly. Organ donation, donor management, recipient selection and a wide range of recipient-related issues, previously less common, have markedly increased, particularly in poster presentations.

These changes seem to reflect an increasing concentration on three of the most pressing present concerns of transplantation - the need to increase the number and clinical acceptability of organ donors, the need to improve organ viability by methods such as hepatic normothermic perfusion and the need to improve both the length of graft survival and the overall quality of a recipient's life. They also show the wide range of interests of the professional groups now involved with the BTS, which are in keeping with its objectives. In the words of Phil Halloran at the Cambridge Congress in 2002, the BTS is a 'mother ship' to transplantation in the UK. This is borne out by examining the achievements of its members over the decades since 1971, as seen through the lens of BTS meetings, congresses and activities.

Like all societies, the BTS faces challenges, which can be both predictable and unpredictable. A well-known and long foreseen challenge is the shortage of donor organs, which has become increasingly pressing as transplantation expands its range



BTS Council Meeting, York, October 2019.
COURTESY OF DR SIAN GRIFFIN

and effectiveness. This has been the subject of government-backed initiatives and also of BTS strategy meetings and sustainability summits. It was the motivation for the introduction of ‘deemed consent’ legislation in Great Britain, initially, in Wales, under the Human Transplantation (Wales) Act 2013 and, more recently, in 2019, in England and Scotland under their respective Organ Donation (Deemed Consent) and Human Tissue (Authorisation) (Scotland) Acts. These Acts, which allow for a number of exemptions, raise ethical issues for some. The resolution of the organ shortage problem is still unclear and may require further advances in the prevention of organ failure and in alternative methods of organ replacement.

Another long-term challenge for the BTS is the equitable accommodation of all forms of transplantation under its umbrella. These naturally differ in terms of their individual pathophysiology, surgical procedures and need for immunosuppression. As the most frequently transplanted organ, the kidney tends to dominate at BTS congresses and in other society activities. Nevertheless, all forms of transplantation share a reliance on organ donation, common methods of antirejection, and an interest in recipient outcomes, both temporal and holistic. They are also subject to the same ethical concerns and legal regulation. These shared issues are strong justification for a society which values the exchange of ideas between its component parts and speaks with a united voice when this is appropriate.

An outstanding example of an unpredicted challenge occurred in 2021, when the COVID-19 pandemic forced the BTS, for the first time in its forty-nine year history, to cancel its planned Congress, due to be held at Manchester. Instead, making use of internet-mediated communication systems, an online Congress was arranged which, considering the short time available to prepare it, proved remarkably successful. Other BTS meetings and Council business since then have been conducted through electronic systems such as ‘Zoom’ and ‘Microsoft Teams’. The COVID-19 pandemic also precipitated major disruption of the national organ donation and transplantation system, a crisis which was endured by many other medical specialties and which will continue to be discussed and investigated for a long time.

Interestingly, the pandemic also accelerated a process within the BTS which had been quietly developing for two or more decades. This was the switch from traditional to ‘paperless’ electronic forms of communication, data recording and data preservation. It had begun in the 1990s, with the onset of email and the first

registration, in 1999, of the BTS website, and gradually gained pace thereafter. For most of the society's previous history, abstracts had been recorded and preserved either in the meeting programmes or, later, in the abstract books. With increasing abstract numbers, these gradually grew in size. The last one in archival possession (Bournemouth 2013) is over 500 pages long. The Glasgow Congress in 2008 was the first for which the abstracts were recorded solely electronically. Since 2014 there has been no physical abstract book. It is now an entirely electronic application, unless downloaded and printed; and the only 'paper' guide is a small, easily pocketed programme. Few find this a matter of concern, in fact most seem to applaud it as a contribution to preservation of the environment. Electronic records have many advantages, including accessibility, reproducibility and seemingly limitless ease of storage. But along with this ubiquity, they can be fragile, open to alteration and instantly destructible. There are many questions, both exciting and troubling, about the pervasive yet evanescent structure of electronic materials and how they may be used in the future. For the BTS, as for many other organisations, this remains to be seen.

Fifty years is not a very long period. Although the founders of the BTS were optimistic, the substantial progress made in that time would surely not have disappointed them. Transplantation, once viewed with suspicion, has become a triumph of twentieth and twenty-first century medicine. Although more needs to be achieved, many of its problems are related to its success. This history, apart from recalling the early days, purports only to tell the story of the BTS, leaving the full tale of transplantation to those who have created it with their brains, hands, research, publications and, in the case of donors and recipients, bravery, endurance and trust. What can be confidently asserted, however, is that the society and its members have at all times been pioneers, discoverers, contributors, promoters and debaters at the forefront of this remarkable science and remain so today, as clearly appears from examination of the past and present activities of our own, and sister, societies, as well as of the world-wide medical and scientific literature. It is in our hands and those of our successors to ensure that it has a future of equal, and increasing, achievement and enlightenment.