

A History of Diabetes Since the Discovery of Insulin – A Family Perspective

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My father, Russ Macaulay, has been diabetic for 72 years of his 75 years of life. His story provides a meaningful glimpse into the life of a diabetic since the discovery of insulin in 1922 by Banting, Best, Collip and Macleod. The remarkable success of insulin therapy for the treatment of diabetes is true testament to the value of basic and clinical research (see 1,2 for review). There are very few examples in science where the benefits of treatment have been so rewarding. Type 1 diabetes is primarily a juvenile onset disease resulting from autoimmune destruction of the pancreatic beta cells that produce insulin. Prior to insulin therapy, patients relied primarily on dietary treatment, the most popular at the time of the discovery of insulin being controlled fasting and restricting carbohydrate while feeding a diet high in protein and fat. In some cases this led to claims that patients could win themselves a few extra years of life, but eventually they wasted away as lipolysis accelerated and free fatty acids taken up by the liver became substrates for ketone formation, leading to acidosis, coma and death.

A variety of extracts were tried as therapeutics, particularly plant extracts, but with little or no success. Can you imagine the excitement of delivering the pancreatic insulin extract to emaciated, wasted children and seeing them return to health over a period of a few months? Not in their wildest dreams would researchers have believed that the development of this treatment would allow diabetics such as my father to live a normal and productive life, to work, play sport at a high level, and enjoy parenthood and grandparenthood. My father lives fully independently to this day, having outlived my mother – she unfortunately died of cancer several years ago.

CSL started production of insulin in Australia in 1923 after trials in late 1922, although it was also supplied from overseas. My father was treated on Burroughs Wellcome insulin from the UK during his early years. Treatment with insulin in the first few years after its discovery was fraught with danger and was not met with universal support. Some argued that it was too potent for general treatment. Ironically, an editorial in the *Medical Journal of Australia* at the time suggested that “hundreds of diabetics would be hastened to their graves” by their treatment with insulin (3). Indeed, potency of insulin in the early years of treatment was variable. Diabetic acidosis was an often a fatal complication in the first four years of the introduction of insulin, with mortality in the range of 50-80%. Hypoglycemic episodes were also common.

Monitoring urinary sugar became a crucial aspect of diabetic care, balancing diet with insulin therapy. My father’s sister has told me that during the early years of his treatment, and the depression years, the cost and availability of insulin meant that dietary restriction was an important aspect of care as this reduced the amount of insulin required. My father was maintained on a restricted, low carbohydrate diet during this phase where every food



Russ Macaulay receiving his 70 year Kellion Award (for having lived with Type I diabetes treatment for so long) from Gordon Bungan (Diabetes Australia) and Dame Elizabeth Murdoch.

portion was weighed. Bread was forbidden but a few dry biscuits were allowable. Not surprisingly, he was thin and physically wasted as physicians and researchers grappled with treatments. Issues of diet, especially increasing carbohydrate intake, had to be balanced with cost and availability of insulin. It was only when he was 14 or so and seen at the clinic at St Vincent’s Hospital in Melbourne that his diet was significantly changed and he was encouraged to eat more and to supplement this with more insulin. The effects of this treatment of course meant that he gained weight and was able to reach his full physical potential.

Biotechnology has had a huge input into patient care for my father and other diabetics. Several factors have had major impacts in the treatment of diabetics. First, significant



Russ Macaulay with his grandchildren, Christmas 2001.

