From a Research Career within the NSW Department of Agriculture to developing a Successful Biotechnology Company

I was born in Murrumburrah, NSW in 1950 and attended St. Columba's school, Harden. I have three siblings, David, Ray and Lynette. Our family moved to Sydney in 1965 and I completed my high school education at Marist Brothers Parramatta. Having won a Cadetship with the NSW Department of Agriculture to study Agricultural Science at the University of Sydney, I specialised in Agricultural Chemistry. On graduation, I took three years leave from the department to undertake a PhD in Agricultural Chemistry with Professor Norman Matheson, on metabolism of carbohydrates on germination of legume seeds. In these studies, I "sowed the seeds" of my future interest in plant polysaccharides and the enzymes active on these polysaccharides. I started my scientific career with the NSW Dept. Agriculture in 1975 at the Biological and Chemical Research Institute, Rydalmere as a biochemist in the Phytochemistry Section under Dr. David Leece. During this time I worked on several projects including rubber from guayule and Nardoo poisoning of sheep in the north-west of the state. The toxic component in Nardoo was found to be the enzyme thiaminase, which destroys thiamine and leads to polioencephalomalacia and death of sheep. With a colleague, Dr. Earl, we linked Nardoo poisoning to the deaths of the early Australian explorers, Burke and Wills, and the work was published in Nature (1994), and has appeared in various forms in National Geographic magazines and television programs. During this period I also continued my interest in polysaccharides and enzymes and this led me to being awarded a Fulbright Foundation Award to study at the Howard Hughes Medical Foundation in Miami (1978-79). I also worked at the ETH, Zurich (1979) and Unilever Research, Bedford (1982-83). On returning to B&CRI in 1983, I undertook research on the development of a method for the measurement of beta-glucan in barley and malt. Beta-glucan is a key quality parameter in barley and oats. A method was developed and published in 1985, and by 1996 this method was validated through the Association of Official Analytical Chemists, and remains the world standard method for this component. In 1988, based on work done post PhD, I was awarded a Doctorate of Science degree in Agriculture by the University of Sydney.

The beta-glucan method was commercialised by Biocon Biochemicals and, to gain a further insight into the requirements of analytical methods for measurement of polysaccharides and enzymes, I took leave from the Dept. of Agriculture and worked in Biocon Biochemicals, Cork, Ireland, in 1986-87. During this time, I developed a passion for small business, so on returning to B&CRI in 1987, my focus was to complete the research I had underway with Dr. Gibson while planning to start a research company. At the end of 1988, having reached the level of Principal Research Scientist within the Dept., I resigned and started my new company, Megazyme, in two garages off the side of the family home in North Rocks, Sydney. With Dr. Gibson, we completed the research we had underway on methods to measure Starch Damage in milled wheat and the Amylose/Amylopectin contents of starches. This work was jointly published and I converted it to test kits which was supplied commercially by Megazyme with royalties paid to the Department.

I worked from the garages for 3 years, with income generated from consultancy agreements with companies in various countries. In 1993, with just 3 employees, Megazyme was named NSW Small Business of the year; which was quite some surprise to me. That same year we relocated to a factory unit in Warriewood, Sydney and developed some production capabilities. We moved again in 1996, but this time to Bray (south of Dublin), Ireland, for both personal and business reasons. Initially we built a 10,000 sq. ft, 2-story facility, but added three extensions (totalling approx. 40,000 sq. ft.) to this over the subsequent years. In 2002, I realised that for the company to grow, we had to make our own enzymes. I established a Molecular Biology division within Megazyme and employed some exceptional genetic engineers who allowed us to produce enzymes recombinantly. In 2013, an Organic Chemistry research facility was built, equipped and staffed, and our fermentation capabilities were expanded.

Over this period of time, the Megazyme team grew to 50 people, approximately half of whom were involved in research. By 2019, Megazyme supplied approx. 700 products, over 100 of which were analytical kits for monitoring quality aspects in the cereals, food, fermentation and dairy industries. Forty kits were developed to support the wine industry. Early on in the growth of Megazyme, I realised that for an analytical method to be widely adopted for use in international trade, it would have to be validated through a professional scientific/industry association such as the Association of Official Analytical Chemists International (AOACI), the American Association of Cereal Chemists International (AACCI), the International Association of Cereal Science and Technology (ICC) and ultimately, Codex Alimentarius (FAO/WHO). So after a method was developed and validated in-house, we organised more widespread evaluation and validation through scientific associations. To date, Megazyme has developed and validated international standard methods for beta-glucan (barley and oats), starch damage, total starch, fructan in foods and animal feeds, resistant starch (starch that is not broken down in the human small intestine), alpha-amylase, alcohol in drink products, lactose in “lactose-free” products, and most recently, dietary fibre. Our method for measurement of dietary fibre in foods has been validated through all of the above associations and in May this year became a Codex Type I method. It is now the world reference method for dietary fibre and will be implemented by FDA and food authorities worldwide, including Food Standards Australia and New Zealand (FSANZ) for measuring and monitoring food fibre claims. My most recent research work has focussed on developing a procedure for the measurement of Available Carbohydrates. These are the carbohydrates, such as sugars and starches, that are rapidly digested in the human body and absorbed through the small intestine. Eventhough the consumption of these is directly related to Type 2 diabetes and obesity, to date, there is no validated method that allows direct measurement of these components. The method we have developed is currently the subject of an international, multi-laboratory validation study under the auspices of AOAC International.

In January this year, I sold Megazyme to Neogen Corporation, a US billion dollar public company. Neogen had approached me several times over the past decade with an interest in purchasing Megazyme. Having reached the age of 71, and with no family members able or interested in running the company, I decided that the best decision for myself, my family, the staff at Megazyme and the company legacy was to sell. The Neogen business focusses on analytical procedures around health and safety issues such as allergen testing, aflatoxins and genetic testing of livestock. Megazyme focussed on food, beverage and feed quality testing, so it is a great fit into the Neogen family of companies.

Needless to say, I had personal reservations concerning sale of Megazyme, but I am comfortable in knowing that it is the right decision. The company allowed me to express my research interests, and both myself personally, and the company, have received numerous scientific and business awards over the years. In 2014, I was awarded the International Achievement award from the University of Sydney, which meant more to me than anything else. However, my work has also been recognised by AOACI, AACCI, ICC and RACI. I was President of the American Association of Cereal Chemists in 2010. Most importantly, the products we developed are used extensively and continue to assist food production and contribute to the quality of food worldwide.

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