

# Insulin: Developments and debate

The development of insulin by Banting and Best in 1923 marked a new era for people with diabetes who were no longer destined for a short life in hospital but could now take control their blood glucose levels and their future (Best and Scott, 1923). Since then, many changes have taken place in the diabetes world, including the development of a number of innovative drugs for managing type 2 diabetes – but insulin has not been left behind. The progression of scientific techniques enabled the molecular structure of human insulin to be modified, which resulted in the introduction of insulin analogues in 1996. Even now, new insulins are in development, as are new modes of delivery, and the debate surrounding insulin is as active as ever.

## Developments in insulin delivery mechanisms and types of insulin

One area where the advancement of technology has benefitted people with diabetes is insulin pumps and continuous glucose monitoring. Indeed, NICE has approved continuous subcutaneous insulin infusion for the treatment of type 1 diabetes (NICE, 2008), with the main challenge now being inequalities throughout the UK and Ireland in whether insulin pumps and pump services are funded. Looking ahead, the results of one recent study would suggest that closed-loop systems, the holy grail of diabetes treatments involving a continuous glucose sensor informing an insulin pump of the appropriate insulin dose via a control algorithm, will soon be a viable option (Hovorka et al, 2011). Results of this study were promising, reporting an improvement in overnight control of type 1 diabetes with a reduction in nocturnal hypoglycaemia.

Despite modern needles and devices making the injection of insulin more acceptable, biotechnology companies are continually searching for less invasive alternative routes of insulin administration (ARIA). Neil Munro and colleagues discuss this further on page 141. Examining statements, limited studies and posters presented, most activity would seem to centre on oral insulin as the most probable ARIA likely to emerge.

The molecular structure of insulin is an area that has received much attention in the past few decades with the development of insulin analogues, and more are in development (Zinman

et al, 2011). Research is focused on developing ultra-long-acting and ultra-fast-acting insulins, and again Dr Munro and colleagues provide more details on page 141.

## Changing patterns of insulin use: The role of primary care

As well as continuing developments in the types and administration of insulin, healthcare professionals – particularly those in primary care – have witnessed a substantial shift in the patterns of insulin usage in recent years. In the past decade, in line with Department of Health initiatives to move care closer to home (DH, 2006), and with the increasing burden of type 2 diabetes, many primary care teams have begun initiating insulin (Coates, 2009), and will no doubt continue to offer this service in the future. Indeed an article by Kathy Ellis on page 181 describes the assessment of one such community insulin initiation service, where individuals were asked about their perceptions and experience of starting insulin therapy, and their HbA<sub>1c</sub> levels improved following insulin initiation.

## Debate on cost-effectiveness

The development of new technologies is often followed by a discussion of the costs these new therapies incur, and insulin is no exception. A debate on the cost-effectiveness of insulin analogues compared with human insulins has been brewing in recent months (Cohen and Carter, 2010). Some believe that the pharmaceutical industry has excelled in marketing the insulin analogues and that “for most people with type 2 diabetes the extra cost does not correspond to the equivalent extra benefit” (Cohen and Carter, 2010). Others believe that the analogues offer important clinical benefits, and furthermore that the focus of the debate should be the need to control diabetes and prevent expensive complications, stating that “the availability of improved medications, not just insulins but other classes of antidiabetic drugs, is likely to play a critical role in changing the trajectory of diabetes, and help contain the escalating costs of treating its complications, in the coming years” (Gough et al, 2011).

There are two sides to every story and there will, no doubt, be much more discussion on this topic in the future. ■



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