

## The Clinical Utility of C-peptide and Antibody Testing

### C-peptide

C-peptide measurement is an inexpensive, widely available test that may assist the clinical management of diabetes, particularly in insulin-treated patients where there is uncertainty about diabetes subtype.

- C-peptide is produced in equal amounts to insulin and can therefore be used to assess endogenous insulin secretion
- C-peptide can be used to differentiate between type 1 and type 2 diabetes, usually in long-standing cases, because there is considerable overlap at the time of diagnosis.
  - Detectable C-peptide after many years of 'type 1' diabetes suggests a misdiagnosis.
  - Conversely, low or undetectable C-peptide levels within the initial years support a diagnosis of type 1 diabetes
- Persistence of C-peptide outside the honeymoon period in a patient thought to have type 1 diabetes may indicate monogenic diabetes or 'Maturity Onset Diabetes of the Young' (MODY). Some forms of MODY, including the commonest (HNF1 $\alpha$  mutation), respond to treatment with a sulfonylurea or may not require glucose-lowering treatment (Glucokinase mutation)
- C-peptide can also be used to ascertain if there is residual  $\beta$ -cell function in patients in whom certain drugs that depend on this for their action are being considered (eg GLP-1 agonists or DPP-4 inhibitors)

### Reference

Jones, AG, Hattersley, AT. Review article. The clinical utility of C-peptide measurement in the care of patients with diabetes. *Diabetic Medicine* 2013;30:803-817

### Humoral autoantibodies in diabetes

- The presence of islet cell antibodies (ICA), insulin autoantibodies (IAA), antibodies against glutamic acid decarboxylase (GAD/GAD<sub>65</sub>) and the transmembrane tyrosine phosphatase IA-2 or ICA512 are evidence of islet cell reactivity
- The presence of any combination of two or more of these antibodies denotes
  - a high risk for the development of autoimmune diabetes in someone with normal glucose tolerance
  - an increasing likelihood that someone with existing diabetes has an autoimmune aetiology in proportion to the number and titres of antibodies present
- More than 70% of people with type 1 diabetes are positive for anti-GAD antibodies at diagnosis and titres may persist for years, making this a useful aid in the diagnosis of latent auto-immune diabetes of adults (LADA)

**Pointers** (to be used in conjunction with other factors – body habitus, age, type of symptoms, family history, presence/absence metabolic syndrome etc). NB Do not measure C-peptide and/or diabetes-specific autoantibodies routinely to confirm type 1 diabetes in adults.

Current diagnosis	Duration of diabetes	C-peptide	GADA/ICA	Suspect
Type 2	Short	Low/absent	Pos	Type 1
Type 2	Longer	Low/absent	Pos	LADA
Type 1	Longer	Significant	Absent	Type 2
Type 1	Any (+ family history)	Significant	Absent	MODY