Year 2003 Paper one: Questions supplied by Tricia

**Question 39**

A healthy 85-year-old woman who is slightly below ideal body weight has a postprandial blood glucose level of 10.0 mmol/L [3.6–6.6]. Which one of the following is most likely to be responsible for the blood glucose result?

A. Increased subcutaneous body fat
B. Decreased circulating insulin levels
C. Increased rate of glucose absorption
D. **Decreased insulin sensitivity**
E. Increased circulating growth hormone

This lady has impaired glucose tolerance so the question is
1. testing our knowledge of T2DM pathophysiology and
2. some understanding of the changes in hormones with aging – 2nd question with this focus in 2003

T2DM is characterized by three pathophysiological abnormalities
1. Impaired insulin secretion
   - insulin compensatory increase in insulin output then decrease, mechanism unclear
2. Peripheral insulin resistance
   - Obesity, particularly visceral or central, is very common in T2DM. Adipocytes secrete a number of biologic products (leptin, TNF-alpha, free fatty acids, resistin, and adiponectin) that modulate insulin secretion, insulin action and body weight and may contribute to the insulin resistance
   - Skeletal muscle
   - Combination of genetic susceptibility and obesity
   - Impairs glucose utilization by insulin-sensitive tissues and increased hepatic glucose output; both effects contribute to the hyperglycemia
3. Excessive hepatic glucose production
   - Increased hepatic glucose output predominantly accounts for increased fasting plasma glucose, whereas decreased peripheral glucose usage results in postprandial hyperglycaemia

- **Answer A** Increased subcutaneous body fat is unlikely she is below ideal body fat
- **Answer B** Decreased circulating insulin levels is unlikely as it represents the later stages of T2DM which is not evident from the question a healthy 85 year old woman
- **Answer C** Increased rate of glucose absorption is not likely as it would result in hypoglycemia if anything
- **Answer D** Decreased insulin sensitivity is a good answer because it would explain the decreased peripheral glucose usage and therefore the postprandial hyperglycaemia
- **Answer E** Increased circulating growth hormone is incorrect as growth hormone is decreased in aging see question 50 paper 1 2003

Answer D