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Theme – health and well being, imaging

Key words – obesity, adipose tissue, development, growth

Fee band – Laboratory based project

Title: Environmental regulation of brown adipose tissue function

Brown adipose tissue (BAT) is a primary target tissue in the prevention of obesity, especially in children. Obesity is clearly of immense global significance and worldwide predictions suggest a catastrophic epidemic of chronic obesity-related disease as its prevalence increases. Environmental factors play a critical role in determining the long-term risks of developing both obesity and the Type 2 diabetes. This concept has been highlighted by the dramatically increased childhood occurrence of these conditions which were virtually unheard of in children 20 years ago. Not only is there a global epidemic of around 155 million obese children, within the United Kingdom for example, its prevalence doubled during the 1990s, with ~4 million children now obese or overweight. Consequently, obesity in childhood is an unprecedented health challenge.

Brown adipose tissue is primarily located within the supraclavicular region and is uniquely able to rapidly generate heat due to the presence of uncoupling protein 1. Heat production by BAT is 300 times that generated by all other tissues. We have pioneered a range of in vivo techniques aimed at quantifying the control of BAT during development. These include the use of thermal imaging of children and adolescents under basal and stimulated conditions. These are being complemented by detailed experimental investigations designed to elucidate the developmental control of brown adipose tissue and promote BAT function in early life. Ultimately, these studies could enable sustainable strategies that prevent excess adiposity in children and adolescents.

Applications are invited from suitable candidates, either clinical or basic science, who are keen to contribute to this highly topical and innovative research programme.

Recent references

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2. Symonds ME, Pope M, Budge H: Adipose tissue development during early life: novel insights into energy balance from small and large mammals. *Proc Nutr Soc* 2012,71:363-370
3. Symonds ME, Pope M, Sharkey D, Budge H: Adipose tissue and fetal programming. *Diabetologia* 2012,55:1597-1606