The VMH is a relatively large nucleus within the hypothalamus and can be anatomically categorised into three subdivisions: dorsal medial (VMHdm), central (VMHc) and ventral lateral (VMHvl).SF-1 neurones directly and indirectly project to neuronal sites such as the parabrachial nucleus, nucleus of the solitary tract and rostral ventrolateral medulla, which regulate SNS activity.Optogenic or chemogenic activation of SF-1 neurones alters SNS-dependent physiological responses, such as increases in heart rateand glucose levels.We recently found that exercise training increases the mRNA levels of SF-1 and putative SF-1 target genes in the mediobasal hypothalamus (which includes the VMH).They found that administration of ?-or ?-AdR antagonists in the VMH of exercising rats reciprocally altered circulating glucose and fatty acids without changing insulin levels.Follow-up studies found that injection of the anesthetic Marcain into the VMH during exercise impaired glucose mobilisation, whereas injection of the anesthetic lidocaine inhibited fatty acid oxidation.Interestingly, inhibition of VMH activity with ?-and ?-AdRs antagonists or lidocaine did not have an effect in sedentary animals.The VMH is required for adaptive energy expenditure in response to environmental challenges such as hypoglycaemia, .a high-fat diet (HFD) and ageing.For example, mice with gene specific manipulations in the VMH develop severe obesity and show impaired diet-induced thermogenesis only when fed a HFD.Additionally, muscarinic receptors in the VMH regulate body temperature and oxygen consumption in response to exercise.These studies demonstrate that VMH neurones contribute to the regulation of metabolism through the partitioning of energy substrates, energy expenditure and heat dissipation.This is consistent with studies showing that the VMH modulates fatty acid mobilisation and oxidation during exercise.Unexpectedly, deletion of SF-1 in the VMH also impaired exercise-induced increases in skeletal muscle mass and PGC-1?The SNS mediates VMH-regulated peripheral glucose uptake.mRNA .expression