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Letters to the Editor

Subthalamic nucleus stimulation in patients with Parkinson's disease does not increase serum ghrelin levels

Patients with Parkinson's disease frequently experience weight loss. The magnitude of the latter may be related to different factors: gender, age, physical activity, gastrointestinal dysfunction, disease duration and pharmacological treatment (L-DOPA therapy) (Lorefalt *et al.* 2004). Subthalamic nucleus deep-brain stimulation (STN-DBS) is an alternative to L-DOPA therapy, improving both Parkinson's disease and motor fluctuations (Limousin *et al.* 1998). Interestingly, patients with Parkinson's disease gain weight after STN-DBS (Volkmann *et al.* 2001; Romito *et al.* 2002; Perlemoine *et al.* 2005). We had the opportunity to show that this weight gain is at least in part due to a decrease in resting energy expenditure, and no modification of food intake was detectable (Perlemoine *et al.* 2005). As STN-DBS electrodes are located close to the hypothalamic centre regulating feeding behaviour, neurostimulation could, however, have triggered an increase in food intake through a modification of neuronal activity (Atrens *et al.* 1987; Cowley *et al.* 2003). Indeed, ghrelin is a hormone secreted by the stomach and duodenum (Kojima *et al.* 1999), as well as by the hypothalamic neurones (Cowley *et al.* 2003), and among other functions, ghrelin is involved in the homeostatic regulation of appetite and energy balance, and subsequently in long-term body-weight regulation (van der Lely *et al.* 2004).

We investigated whether ghrelin levels would change with STN-DBS and/or L-DOPA treatment in two groups of patients with Parkinson's disease: those taking chronic dopamine therapy alone (*n* 12; L-DOPA-alone group) and those with an implanted neurostimulator associated with chronic dopamine therapy (*n* 12; STN-DBS group). All patients were investigated before and after receiving dopamine treatment. Furthermore, the group of patients with an implanted neurostimulator were investigated with and without ongoing neurostimulation. Thus, four conditions were achieved: DBS + /L-DOPA +, DBS + /L-DOPA−, DBS−/L-DOPA +, DBS−/L-DOPA−. Details about the patients and the protocol have previously been reported (Perlemoine *et al.* 2005). Total fasting ghrelin was assayed in duplicate with an RIA assay (Linco; St Charles, MI, USA).

When the patients were considered according to their chronic treatment, L-DOPA treatment did not have a significant acute effect on ghrelin levels either in L-DOPA-alone patients or in the STN-DBS patients off neurostimulation (DBS−; Table 1; $P>0{\cdot}05$, paired *t* test). STN-DBS itself did not elicit a modification of ghrelin levels in STN-DBS patients off L-DOPA (Table 1; $P>0{\cdot}05$, paired *t* test). In this group of patients on neurostimulation (DBS +), L-DOPA achieved a significant reducing effect ($P=0{\cdot}05$, paired *t* test).

Total circulating ghrelin does not therefore play an important role in the modification of weight homeostasis in patients treated by neurostimulation for Parkinson's disease. This is in agreement with recent findings that although patients with hypothalamic damage (tumour) show impaired satiety, there is no change in circulating ghrelin concentrations in response to a test meal (Daousi *et al.* 2005). Despite these unchanged concentrations, one cannot exclude the suggestion that ghrelin-containing hypothalamic neuronal activity could be modified but undetected owing to its minor contribution to circulating ghrelin. Peripheral ghrelin is, however, able to act on the central nervous system, unlike other comparatively potent orexigenic agents such as neuropeptide Y, agouti-related protein and melanocortin hormone (van der Lely *et al.* 2004). The reduction in ghrelin levels by L-DOPA administration in neurostimulated patients should therefore be noticed: as most of these patients can reduce their daily dose of L-DOPA owing to the favourable effect of neurostimulation, this may contribute to a stimulation of appetite and weight gain because of higher ghrelin levels. Whatever the case, these results do not favour treatments of weight variations of patients suffering Parkinson's disease with ghrelin analogues (agonists or antagonists).

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Table 1. Fasting ghrelin levels of the two groups of patients according to their neurological treatment: off/on L-DOPA and/or on/off deep-brain stimulation (DBS)

(Means and standard deviations, pg/ml)

	L-DOPA off				L-DOPA on			
	DBS on		DBS off		DBS on		DBS off	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
L-DOPA-alone patients	n.a.		936	293	n.a.		919	317
STN-DBS patients	932	177	880	155	879	177	883	201

n.a., not applicable; STN, subthalamic nucleus.

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Monounsaturated fatty acid-based lipid emulsions in critically ill patients are associated with fewer complications

I would like to make some comments in relation to the elegant commentary of Yaqoob (2005), published recently in this journal. Dr Yaqoob rightly considers that is important to evaluate whether using parenteral nutrition, in whatever form, increases the risk to the patient without any added benefit. In this respect, she reviews three studies evaluating the use of an olive oil-based lipid emulsion (ClinOleic, Baxter, Maurepas, France) in the home parenteral nutrition of patients with intestinal failure. She concludes that there is no added benefit from ClinOleic, compared with soyabean oil-based emulsions, with regard to complications in such patients, but that there is no evidence of harm either. I absolutely agree with this opinion.

Although Dr Yaqoob states that the studies of patients receiving home parenteral nutrition do not provide insight into critically ill patients, results from studies using ClinOleic in the latter group of patients are now available. We recently published in this journal results on short-term parenteral nutrition in very critically ill (severely burned) patients, comparing ClinOleic and a mixture of medium- and long-chain triacylglycerols (Garcia-de-Lorenzo *et al.* 2005). Our results showed that the abnormalities in liver function related to parenteral nutrition were more frequent in the group receiving medium- and long-chain triacylglycerol than in the ClinOleic group ($P = 0.04$).

Furthermore, another article comparing an olive oil-based lipid emulsion parenteral nutrition with glucose-based parenteral nutrition in multiple trauma patients shows a significantly lower blood glucose level, a clinically relevant shortening of duration of stay in the intensive care unit and a shorter time on mechanical ventilation in the group receiving the olive oil-based lipid emulsion (Huschak *et al.* 2005).

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