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Research Article

Nutraceutical Improves Blood Glucose, Peripheral Serotonin and Reduce Body Fat

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Introduction

Serotonin (5 hydroxytryptamine; 5 HT) is generally associated with its actions in the central nervous system (CNS) as a neurotransmitter involved in activities such as mood regulation, food consumption, sleep, sexual activity and pain [1]. However, CNS serotonin represents only a small proportion of our body's total 5-HT. The other amount, peripheral serotonin, is produced in the intestine, through enterochromaffin cells, acting specifically in this tissue, as well as in other peripheral tissues. The concept that central and peripheral 5 HT are distinct sets is supported by the idea that the blood-brain barrier is relatively impermeable to 5 HT. This means that serotonin produced outside the CNS does not cross the CNS blood vessels to reach neurons [2]. Peripheral serotonin plays important roles in many diseases. It has been found that serotonin has marked pro-inflammatory and pro-oxidation functions in diseases linked to inflammation [3-5]. Serotonin influences the functions of brown and beige adipocytes, which are involved in thermoregulation. Serotonin levels are elevated in the brown adipose tissue of obese mice, and this leads to decreased thermogenesis and energy dissipation by brown adipocytes, probably by suppressing β-adrenergic-induced expression of Upc1 [6]. Another study showed that under high-fat diets in mice, inhibition of 5-HT synthesis in adipocytes reduced weight gain, improved glucose tolerance and decreased lipogenesis in white adipose tissue. Furthermore, in a diet-induced type 2 diabetes model, decreased serotonin levels improve glucose tolerance [7]. Based on the metabolic effects of peripheral serotinin, the present study aimed to verify the effect of nutraceutical supplementation on glycemic parameters, plasma serotinin levels and body fat.

Materials and Methods

Eight patients were selected for the study, four men and four women, aged between X and Y. Both patients received 200mg of the nutraceutical pyroglutamyl amidoethylindole. Patients were instructed to consume the nutraceutical in the morning. Patients were also advised to maintain normal work, eating and physical activity habits. Before the study (T0), patients underwent Bio impedance assessment (InBody 270), as well as blood tests to assess glycemic and peripheral serotonin levels. Blood collection was performed at the beginning and end of treatment. All collections were made in the morning and after a 12-hour fast. The nutraceutical supplementation lasted 60 days. After this period (T1), patients were again subjected to bio impedance assessment and blood tests.

Results

The glycemic, peripheral serotonin and fat percentage values (mean and standard deviation) evaluated before nutraceutical supplementation are presented in the table below (Table 1).

	Blood glucose (ng/dL)		Peripheral serotinin (ng/mL)		Body fat (%)	
Subject	T0	T1	T0	T1	T0	T1
1	90	74	354,7	241	36,7	36,7
2	76	64	175,8	173,7	47,3	44,5
3	91	71	115,3	155,5	41,1	37,6
4	72	68	187,2	240	41,2	38,2
5	79	77	262,1	145,3	32,3	32,3
6	75	80	324,6	181	30,2	27,1
7	80	80	123	97	17,4	16,1
8	82	80	26	41,3	27,9	24,8
Mean	80,6	74,3	196,1	159,4	34,3	32,2
SD	6,8	6,1	111,6	67,4	8,7	8,4

Table 1: Values (before and after) of fasting glycemic parameters, peripheral serotonin and body fat percentage.

After supplementation, there was a 7.8% reduction in glycemic parameters, an 18.7% reduction in peripheral serotonin and a 6.1% reduction in the percentage of body fat.

Discussion

We demonstrated in this study that supplementation with the nutraceutical pyroglutamyl amidoethylindole was able to reduce fasting blood glucose, peripheral serotonin levels and reduce the percentage of body fat after 60 days. A recent study, conducted by our group, showed that pyroglutamyl amidoethylindole also has an effect on reducing salivary cortisol levels in individuals with excess body weight [8]. Elevated cortisol is associated with an increase in circulating plasma sugar [9], which could explain the reduction in glycemia in the present study, however, in the present study, cortisol levels were not evaluated.

Peripheral serotonin is currently understood as a hormone that regulates the function of many body tissues [10-13]. Studies demonstrate that reducing peripheral serotonin synthesis and signalling in adipose tissue can prevent obesity, insulin resistance and non-isolated fatty liver disease due to increased energy expenditure from brown and beige adipose tissues [14]. The inhibitory effects of serotonin on energy expenditure are attributed to the β-adrenergic reduction of the thermogenic program in brown and beige adipocytes. With the reduction of peripheral serotonin, there is a greater activity of thermogenesis mediated by mitochondrial uncoupling proteins (UCP1), which increases the thermogenic effect and energy expenditure [15,16]. In the present study, an 18.7% reduction in peripheral serotonin levels was observed, accompanied by a reduction in body fat. Thus, it is believed that this decrease in the amount of body fat may be a positive reflection of the increase in thermogenesis in supplemented individuals.

Conclusion

In summary, the nutraceutical containing pyroglutamyl amidoethylindole was able to promote the reduction of body weight, reduce the levels of peripheral serotonin and plasma glycemia. Thus, we conclude that pyroglutamyl amidoethylindole can be an effective strategy in the treatment of metabolic diseases, such as overweight and obesity, in addition to helping with weight loss.

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