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LETTER TO THE EDITOR

Letter to the Editor

Sirs

Serotonin and information processing: a pharmacodynamic study on the effects of citalopram on cognitive and psychomotor function

Psychopharmacological studies have shown an enhancement of sustained attention, improved control of motor responses to sensory stimuli and improved efficiency of information processing with enhancement of serotonergic function (Hindmarch, 1995). Serotonin re-uptake inhibitors (SSRI) such as sertraline, fluoxetine, fluvoxamine, paroxetine and citalopram exert their pharmacological actions by inhibiting the re-uptake of serotonin (5-HT), varying in their potencies of inhibition. It has been suggested that within the SSRI class, different antidepressants affect cognition and psychomotor performance differentially, either neutrally or positively, presumably dependent on their relative selectivity and potency for 5-HT re-uptake inhibition (Amado-Boccara *et al*., 1995).

The aim of the present study was to examine the cognitive and psychomotor effects of acutely increasing serotonin concentrations in the central nervous system (CNS), after administration of the most selective SSRI, citalopram, in nine healthy male subjects aged 20–34 years (mean ± SD; 25·3 ± 5·6). All subjects received a single clinical dose of either placebo or citalopram (20 mg), in a double-blind placebo-controlled design. Cognitive and psychomotor tests were examined pre- and 1, 2 and 4 h post drug administration. The tests performed included the Critical Flicker Fusion test (CFF), which assesses the information processing capacity in the central nervous system, and the Choice Reaction Time test (CRT), which measures psychomotor speed. Citalopram improved psychomotor responses to sensory stimuli and sustained attention, and information processing capacity with significant decreases in movement times of the CRT test ($F = 11{\cdot}57$, $p < 0{\cdot}05$), and an increase in CFF threshold ($F = 11{\cdot}44$, $p < 0{\cdot}01$) (see Table 1).

These findings are comparable with the

Table 1. Maximum change for critical flicker fusion thresholds and movement time (choice reaction time) relative to baseline for placebo and citalopram

Critical flicker fusion thresholds (Hz)				
Drug condition	Time point	Mean ± SD	Maximum change relative to baseline	*F*
Placebo	Base line	32·74 ± 5·5	–	
	T_{max}	32·39 ± 6·23	−0·35	
Citalopram	Base line	32·29 ± 5·96	–	
	T_{max}	33·78 ± 5·69	+1·49	11·44*
Choice reaction time (movement time) (s)				
Placebo	Base line	0·45 ± 0·05	–	
	T_{max}	0·46 ± 0·06	+0·01	
Citalopram	Base line	0·44 ± 0·04	–	
	T_{max}	0·47 ± 0·04	−0·03	11·57*

* $p < 0{\cdot}01$ compared to placebo ((+) better than placebo (−) worse than placebo). Repeated measures ANOVA, planned comparisons.

pharmacodynamic effects of the SSRIs sertraline and paroxetine which have been both shown to increase CFF threshold and decrease CRT (Hindmarch and Bhatti, 1988; Sherwood and Hindmarch, 1993; Kerr *et al*., 1991). However, the findings are contrary to the effects of other SSRIs, fluvoxamine and fluoxetine, which were both shown to have neutral effects on CFF and CRT, compared to placebo (Hindmarch, 1995). The reason for this discrepancy may be related to the relative potencies of the SSRIs for inhibition of serotonin re-uptake. The SSRIs that had positive effects, have higher reported potencies for serotonin uptake inhibition (sertraline, 0·19 nM; paroxetine, 0·29 nM; citalopram, 1·8 nM than those that had neutral effects (fluvoxamine, 3·8 nM; fluoxetine, 6·8 nM (Hyttel, 1994). Therefore the observed behavioural effect may be related to the relative potency of the compounds for inhibition of 5-HT re-uptake and as a result the relative potencies of the compounds to increase 5-HT neurotransmission. In conclusion, our findings suggest that increasing serotonergic neurotransmission improved psychomotor responses to sensory stimuli and sustained attention, and information processing capacity, and that this effect is dependent on the relative potency of the SSRI to inhibit re-uptake of serotonin.

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