Effects of selective serotonin reuptake inhibitors on three sex steroids in two versions of the aromatase enzyme inhibition assay and in the H295R cell assay

Selective serotonin reuptake inhibitors are known to have a range of disorders that are often linked to the endocrine system e.g. hormonal imbalances, breast enlargement, sexual dysfunction, and menstrual cycle disorders. The mechanisms behind most of these disorders are not known in details. In this study we investigated whether the endocrine effect due to SSRI exposure could be detected in well adopted in vitro steroidogenesis assays, two versions of the aromatase enzyme inhibition assay and the H295R cell assay. The five drugs citalopram, fluoxetine, fluvoxamine, paroxetine and sertraline, were shown to inhibit the aromatase enzyme in both types of aromatase assays. The IC50 values ranged from 3 to 600μM. All five SSRIs, were further investigated in the H295R cell line. All compounds altered the steroid secretion from the cells, the lowest observed effect levels were 0.9μM and 3.1μM for sertraline and fluvoxamine, respectively. In general the H295R cell assay was more sensitive to SSRI exposure than the two aromatase assays, up to 20 times more sensitive. This indicates that the H295R cell line is a better tool for screening endocrine disrupting effects. Our findings show that the endocrine effects of SSRIs may, at least in part, be due to interference with the steroidogenesis.

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