

## Summary of Project

The Effects of Curcumin on Symptoms of Attention Deficit Hyperactivity Disorder (ADHD) in a Sample of School Aged Children

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Attention Deficit Hyperactivity Disorder (ADHD) is characterised by symptoms including inattention, hyperactivity and impulsive behavior. The causes of ADHD are complex with many psychological, social, genetic and biochemical factors contributing to its development. The most common explanations of the development of ADHD relate to the function of the neurotransmitters dopamine and noradrenaline (chemical messengers in the brain). These specific chemicals are thought to be important in regulating attention, memory and impulsive behaviours.

Stimulant medication is currently the first line treatment for ADHD, with methylphenidate and amphetamines commonly prescribed. These medications work by increasing the concentrations of dopamine and noradrenaline in the brain. While these medications are effective, they can also cause undesirable side effects including reduced appetite, weight loss, sleep difficulties, abdominal pain, tics, jitteriness, and headaches. Negative long-term effects such as growth suppression have been linked to long-term stimulant use in children.

New research has suggested that pathways in the brain related to inflammation, and oxidative and nitrosative stress may also play a significant role in the development of ADHD. Studies have investigated the effects of anti-inflammatories and antioxidants (fish oil, zinc, vitamin C and other supplements) on ADHD symptoms with mixed results. In some studies, these supplements resulted in a decrease in ADHD symptoms; however, others showed no reduction or no difference to a placebo.

Curcumin is an anti-inflammatory substance which is derived from the plant turmeric. Research into the effects of curcumin has found that it has beneficial effects on psychological disorders such as depression. In the current study, curcumin was given to children with ADHD to determine whether this resulted in a reduction in inattention, hyperactivity, and related symptoms.

**Method:** Seventy children participated in a twelve-week double-blind placebo controlled trial in which they were given curcumin capsules (in either 250mg or 500mg doses) or placebo. Changes in symptoms over time were measured by parent-completed questionnaires (ADHD Rating Scale, Strength and Difficulties Questionnaire). In addition, attention was tested at completion of the trial using the Test of Everyday Attention for Children (TEA-Ch).

**Results:** Only those children who took 80% or more of the capsules over the study trial period were included in the analysis of results (as measured by parent self-report). Statistical analysis revealed significant reductions in hyperactivity, inattention, conduct and associated symptoms as measured by parent completed questionnaires. However, these symptom reductions were found within *all* groups (curcumin and placebo) and there were no significant differences between groups. These results suggest that curcumin is no more

effective in reducing symptoms of ADHD than placebo. In addition, no significant differences were found between groups on the cognitive test of attention.

Additional analyses were conducted to determine if the socioeconomic status of participants (as measured by suburb), and participant engagement (whether or not participants completed every part of the study) could account for the differences in change scores between participants. This analysis did not find any significant results.

**Conclusion:** These results may reflect the placebo effect or report bias, rather than changes associated with the anti-inflammatory properties of curcumin. In order to investigate this further, additional trials utilising much larger sample sizes of participants are required.