Depression is increasingly recognized as a multifactorial condition influenced by neurotransmitter dysregulation, neuroinflammation, oxidative stress, and nutritional deficiencies. This project aims to evaluate a novel therapeutic strategy targeting the factors contributing to depressive symptoms. We plan to synthesize and assess new stable compounds that combine established antidepressant drugs with anti-inflammatory agents, antioxidants, or zinc supplements. The primary objective is to investigate synergistic mechanisms addressing the underlying pathophysiology of depression beyond traditional monoaminergic modulation.

Our focus will be on combining drugs such as selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), and serotonin modulators and stimulators (SMSs) with compounds like astaxanthin, inosine, and zinc. The project will include four key phases: synthesis and optimization of combined compounds for stability and solubility, assessment of biological activity using laboratory fish (Danio rerio), in vivo studies involving screening tests and stress models, and evaluation of mechanisms of action, including its anti-inflammatory and antioxidant activities.

The anticipated outcomes include the development of compounds with enhanced antidepressant efficacy, faster onset of action, improved tolerability, reduced effective doses, minimized side effects, and the convenience of single-tablet administration. We hope our compounds will pave the way for a new generation of combination therapies addressing both the psychological and biological dimensions of depression.

Our approach aligns with the growing interest in personalized psychiatry and responds to the need for multidirectional interventions in the treatment of complex neuropsychiatric disorders.

One significant advantage of our approach is that combining two therapeutic agents could improve patient adherence to treatment regimens, which is particularly important for individuals taking multiple medications.