Sepiapterin reductase is the final enzyme in the biosynthetic pathway for tetrahydrobiopterin — a cofactor used by other enzymes in the synthesis of the neurotransmitters dopamine and serotonin.

In the case of dopamine biosynthesis, the enzyme tyrosine hydroxylase uses tetrahydrobiopterin to convert tyrosine to L-DOPA. In a second reaction, the enzyme aromatic L-amino acid decarboxylase converts L-DOPA into dopamine, the active neurotransmitter.