

Sathiyamoorthy N., Laraib A.
ROLE OF MELATONIN IN PREGNANCY
Tutor: PhD, associate professor Keis G.D.
Department of Radiation Medicine and Ecology
Belarusian State Medical University, Minsk

Melatonin has an important role in pregnancy functioning as it acts a powerful antioxidant to protect the placenta and fetus from damage therefore supporting fetal development and maternal health. Naturally the body increases melatonin levels during pregnancy as the placenta produces melatonin in a non-circadian manner. Melatonin is a strong direct scavenger of highly toxic free radicals, protecting placental trophoblasts from cell death (apoptosis) and damage.

Melatonin acts by crossing the placental barrier and binding to Melatonin Receptor 1A (MTNR1A) and Melatonin Receptor 1B (MTNR1B) which are present on placental cells, the fetus, and the myometrium. The melatonin receptors are G-protein-coupled receptors which trigger signaling reducing oxidative stress and controls inflammation. Like, MTNR1B regulates N6-methyadenosine (m6A) Ribonucleic Acid (RNA) methylation to suppress Lipopolysaccharide (LPS) which induces inflammation, autophagy, and apoptosis in early pregnancy. It can be seen that in gestational diabetes a decrease in melatonin levels causes an increase in glucose transport to embryos, which could then increase the oxidative state of cells by decreasing free radical scavenging, increasing oxidative metabolism, or both.

Researches suggest that melatonin works with oxytocin respectively to increase sensitivity of the uterus causing labor contractions to often peak during the night when melatonin level are highest. Melatonin phosphorylates caldesmon sensitizing myometrium to oxytocin enabling actin-myosin interactions for stronger contractions. It activates Protein Kinase C and Myosin Light Chain Kinase while increasing Connexin-43 for synchronized labor.

Melatonin also shows lipophilic nature due to which it crosses the placental barrier with ease. This provides the fetus the information about the external day-night cycle. This “photic information” helps to set the fetal circadian rhythm entraining fetus’s internal biological clock *in utero*.

Hereby concluding that melatonin is a multi-faceted regulator of pregnancy, offering essential neuroprotective and antioxidant benefits to the fetus while coordinating the timing and efficiency of labor. While evidence suggests that melatonin supplementation can have a positive effect on both mother and child, long-term clinical trials remain imperative to establish a final clinical consensus regarding its therapeutic use in obstetric care. Now we can say that the use of melatonin in early life could preserve the safety of life in the future.