

The effect of obesity on pregnancy

[Science](#), [Biology](#)



Proportion of population who have adult obesity increases over last decades in both US and Australia. Obesity increases the risk of have metabolic syndrome which includes cardiovascular disease, heart disease, stroke etc. which is detrimental to various systems of body. Maternal obesity during pregnancy not only brings negative outcomes to mother, but also to the fetuses and some of them can be long term consequences. Whether the maternal obesity will lead to placental inflammation or is controversial. However maternal obesity will influence circadian rhythms during pregnancy by changing clock gene expression which then affects liver and adipose tissue metabolism and melatonin supplementation can be one solution to that.

Disrupted circadian rhythms due to maternal obesity and melatonin as a treatment to circadian disruption • After the study on rats, it was found out clock gene expression was suppressed, mesor and amplitude of clock gene expression was lowered and decreased respectively which affect liver and adipose tissue metabolism of mother.

Melatonin can be a possible treatment for alleviating negative effects caused by change of clock gene expression. As I also learned from the previous lecture in this unit, maintaining normal circadian rhythms is vital in order to maintain normal metabolic processes in the body. Maternal obesity can be a factor to induce circadian rhythm disruptions which has negative effects on both mothers and fetuses' health because of change of metabolism. This which leads me wondering about how exactly the offspring of obese mothers also have a negative health outcome. In another study that was done on rats, although the precise mechanisms which leads to metabolic

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dysregulation in the offspring were not clear at the start, but it was later found out that offspring of obese dams also experienced change of expression of main clock genes and change of mRNA expression of peroxisome proliferator activated receptor (PPAR) α which then may increase offspring susceptibility to obesity development in later life. In this study, although the circadian rhythm disruptions were not as apparent as the one showed during lecture, but it was undoubting that oscillatory amplitude of core clock gene expression was altered in offspring of dams who were treated with high fat diet. Also, it was known that offspring who has exposed to maternal obesity will have reduced mRNA expression of PPAR α target genes just before the development of obesity which coincides with the result from this study, that mRNA expression of PPAR α in offspring from obese dams was lower than those lean dam offspring. This which suggest that offspring of obese mothers will also have disrupted circadian rhythms and reduced PPAR α mRNA expression which not only will leads to metabolic dysregulation, but also leads to obesity that can be developed later in life. Melatonin is an indoleamine produced from pineal gland and it acts as anti-inflammatory agent and it is also a more effective antioxidant compare to other antioxidants such as vitamin C and E due its ability to across blood-brain barrier and placenta to protect placenta and fetuses.

It was known from lecture that melatonin can be a treatment to circadian disruption, but the mechanism of that was not explained in detail. In this article, it explained that melatonin is produced in a circadian manner and this circadian production of melatonin can also be disrupted by abnormal exposure of mother to light which also changes the rhythmic expression of

fetal clock genes. However, these changes can be reversed by daily injection of melatonin into mothers which makes melatonin a possible treatment to disrupted circadian rhythms.

Overall, this lecture illustrated an increasing concern of obesity and its impact on people, particularly pregnant women's health. From this lecture, it is interesting to learn that omega 3 fatty acid can be a treatment to obesity-induced placental inflammation which I never thought about it before.