

## **Why does menstruation cycle synchronize with moon cycle?**

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### Abstract

Primates are mammals with menstruation cycle. The menstruation cycle is around 28-35 days in most primates. The cycle is synchronizing with moon period. Why does menstruation cycle synchronize moon cycle? Here, I propose that the phenomenon is because primates and bats need to increase the change of fertilization. Primates can stand with two legs. In majority of time, they maintain the straight position of their bodies. In this position, sperms will need swim against gravity toward Fallopian tube after intercourse. They will need to take 1-12 hours to meet the oocytes. Straight body position will increase the difficulty to let sperms to meet oocytes. Thus, gravity force can affect the chance of fertilization. Moon is the major source of tidal force. The moon cycle will affect the magnitude of gravity force. Thus, primates and bats evolve menstruation cycles to let the ovulation occur during the less-gravity period. So, menstruation cycle is synchronizing the moon cycle. That is the reason why primates and bats, not other mammals, have menstruation cycles.

### Main text

Besides primates and bats, most mammals do not have menstruation periods. The menstruation period is about 28-35 days for most primates. This period is about the cycle of moon. Moon provides tidal force to affect the gravity strength on earth. Here, I propose that menstruation period is evolved to overcome gravity force to facilitate fertilization in primates, so it synchronizes with moon cycle.

Primates are the mammals who can stand up with two lower legs. They can maintain this upright position during daily activity. Why is there menstruation cycle for primates is a puzzle. Why evolution lets primates to have menstruation cycle. The reason is the enhance the rate of fertilization. After intercourse, sperms usually take 1-12 hours to enter the Fallopian tube to meet oocytes for fertilization. During the long period of time with upright body position, it is important to account for gravity force to affect the sperm swimming from lower body position to higher body position in the Fallopian tube. Thus, lower gravity force will enhance the fertilization rate for sperms to meet the oocyte. Our moon is spinning and orbiting in a period about one month. The moon cycle will have tidal influence to affect gravity on earth. The moon

cycle is related to the periodic change of lowest gravity to strongest gravity. In order to combat the gravity influence on fertility, primates and bats standing with two legs evolve the menstruation cycle to synchronize the moon cycle. That is the reason why primates, not other mammals, have menstruation cycles and these cycles are synchronizing with the moon cycle.

Certain occupation females usually experience a symptom of menstruation dysregulation including female airline attendant, female car driver, female sportsperson, and female astronauts. There is no satisfying explanation to these people's dysregulation of menstruation until now. In addition, it is still a puzzle what is the mechanism to trigger LH surge to start ovulation. Here, I propose that less gravity during new moon and full moon will help to trigger elevated LH concentration to start LH surge to initiate ovulation. Vestibular nerve system is the nerve system to sense motion and acceleration including gravity. There is a connectivity between vestibular nerve system and periventricular nucleus in hypothalamus. And, GnRH releasing neurons are located in the periventricular nucleus in the hypothalamus. Thus, the sensation of gravity via vestibular nerve may transmit signal to GnRH neurons in hypothalamus to release GnRH. In turn, GnRH triggers LH surge to trigger ovulation during the lowest gravity situation in full moon or new moon. Because astronauts or airline attendants work in the low gravity condition, they have great chance to dysregulate the GnRH or LH secretion. Female car drivers usually accelerate or de-accelerate the car to undergo force change and female sportspersons usually receive weight training to receive force upon them. Thus, they can usually suffer from acceleration force and affect the vestibular system. In previous spaceflight experiments, low gravity condition does increase LH elevation in male astronauts. But, the experiments for female astronauts are not so clear. However, I still suggest the low gravity due to the moon's tidal influence is the trigger for LH surge in women.

Previous studies found that menstruation period usually happens in the new moon or full moon. Because there are 14 days period apart from menstruation and ovulation, menstruation in new moon will let ovulation happen in full moon. This will allow both periods happen in low gravity condition affected by moon's tidal influence. Menstruation period will prevent primate intercourse and let primate's intercourse near the time of ovulation. LH surge before ovulation also triggers androgen elevation in female primates to increase their libido. This mechanism can increase the rate of fertilization.

There is an unexplained effect called lunar effect. It suggests that birth rate is slightly increased in the full moon. Because the pregnancy period is classically 280 days which are 10 cycles of menstruation period length. If fertilization happens in the ovulation day in new moon or full moon, the delivery date will also trend to happen in the new moon or full moon. This could explain the above phenomenon. Lunar effect also says the human aggressive behaviors increase in the full moon including psychosis attack or crime rate. In the full moon or the new moon, elevated LH with elevated androgen might help to explain the aggressive behavior. This provides the underlying mechanism for lunar effect.

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