

A) Outline research into two types of biological rhythm (12 marks)

There are many biological rhythms in the natural world, divided generally into four groups; ultradian, circadian, infradian, and circannual.

Circadian rhythms occur once every 24 hours, an example of this being the human sleep/wake cycle and many other physiological rhythms, such as body temperature, operate to the same system. Research into this rhythm has mainly focused on the sleep/wake cycle, such as Siffre's (1972) free-running biological clock study, where he spent six months in a cave with no clock or natural light. He slept and ate whenever he wanted, with the experimenter turning his light on and off according to whether he was asleep or not. He was wired up so that his various bodily functions could be recorded. At first his sleep/wake pattern was very erratic, until it settled down to an average 25-hour day. Another circadian rhythm study was carried out by Folkhard et al (1985) where participants were removed from any natural light with an attempt to shorten their day. But it was found that participants could not adapt to less than a 23-hour cycle.

Infradian rhythms occur less than once every 24 hours, for instance, hibernation in squirrels and the human menstrual cycle. Research into this rhythm has concentrated mainly on the human menstrual cycle, such as Reinberg's (1967) study of a woman who spent three months in a cave with dim lighting levels. Her sleep/wake cycle lengthened and her menstrual cycle shortened. It took a further year for her menstrual cycle to return to normal. Another infradian rhythm study was carried out by McClintock (1971) who pointed out how a woman's menstrual cycle can be entrained by the cycle of other women with whom she spends a great deal of time, such as in nunneries or boarding school. After some time the women's cycles become synchronised. It was also found that women who work with men have shorter menstrual cycles.

B) Assess the impact of disrupting biological rhythms in humans (12 marks)

Disruption to a human's biological rhythm can be seen as detrimental to a person as has been seen in research done into circadian rhythms, this disruption can take the form of either desynchronisation, when different rhythms adapt at different rates, or flattening, when the amount of circadian variation is reduced.

Hauty and Adams (1966) found that physiological measures (body temperature and heart rate) took from between 4 and 8 days to adjust, behaviour taking less time. This is an example of desynchronisation caused by jet lag, and shows a definite change in both a human's physical and mental state due to a disruption of the person's circadian rhythm.

Shift work can also be a factor in a person's circadian rhythm being disrupted as seen in studies such as Blakemore's study of workers in a chemical company in Utah working a 3-shift system. These workers were unhappy, more likely to become ill, and less productive than they may have been. Also, the impact of shift work on a person's circadian rhythm was seen as detrimental in Gold et al's (1992) study of nurses who worked on rotating shifts. They found these nurses made twice as many errors at work than those on permanent day or night shifts, showing rotating shifts to

be more disruptive to sleep even more so than sleeping during the day. This constant readjustment of a human's biological rhythm doing shift work shows a clear detrimental impact on the person's concentration and health. This in turn highlights the problems of any disruption to this rhythm, either by flattening or desynchronisation.