Why do groups of women living in the same household have synchronous menstrual cycles?

Social regulation of ovulation, of which the most common form is menstrual synchronicity, has been observed in women living together. It has been found in room-mates, close friends, lesbian couples and most strongly between mothers and daughters. It has also been noted in mice, hamsters and rats, as well as prosimian primates such as the ring-tailed lemur.

The pioneer in this field of research is Martha McClintock of the Department of Psychology at the University of Chicago. She first reported her observation in Nature in 1971 and it has come to be known as the McClintock effect. It is believed that chemosensory signalling involving at least two pheromones and the vomeronasal organ (VNO), also known as Jacobson's organ, is responsible for the effect.

Pheromones are airborne chemical signals that are not consciously detected as odours but are sensed by the VNO inside the nose. They are released by specialised skin glands that are concentrated under the arms. Pheromonal signals received by the VNO reach the hypothalamus in the brain where they induce some hormonal changes that result in a physiological or behavioural response.

In rats there is some evidence for the involvement of pheromones in the McClintock effect - it seems that living in different cages with a common air supply is enough for ovulatory convergence. But although humans do have a potentially functional VNO, many are sceptical about whether it actually does anything.

Following up the original observation, Kathleen Stern and McClintock published experimental data in 1998 again in Nature which suggests that two pheromones specific to different phases of the menstrual cycle play a role in synchronicity.

The menstrual cycle consists of three phases: the menses, follicular (pre-ovulatory) and luteal (post-ovulatory) phases. One of the pheromones is released by women in the pre-ovulatory phase of their cycle and accelerates ovulation in others, that is, it shortens their cycle. The other one is emitted at the time of ovulation. It has a delaying effect and thus lengthens the others' cycle. The end result is that the cycles of women living closely tend to converge over time.
Menstrual convergence does not always occur and not all groups synchronise, probably because of the different competing influences encountered in different situations. In a group of unrelated women, it is not yet clear whether they all change equally to have common cycle lengths or a dominant woman's cycle is copied by others, although the latter is considered more likely.

Most studies to date have dealt with women of college age and it is not known if the phenomenon also exists in older women with more stable menstrual cycles. Most importantly, the pheromones are still putative and have not been defined chemically. We may find out what they are, but why they do this remains an unanswered question. It might turn out to be the remnant of a regulatory

mechanism found in some animals, including monkeys, for synchronising mating, conception and subsequent births in different individuals. Great apes and humans no longer need the mechanism because long intervals between births mean they have become non-seasonal breeders.
Research in the field continues because the identification of the relevant pheromones will have far-reaching implications for infertility treatment and contraception. Tevfik Dorak , Birmingham, Alabama, US

As Tevfik Dorak points out, it is still unclear why menstrual synchrony has evolved. A possibility is that it is a relic from an earlier stage of human evolution. To understand how this might be so, we must understand some of the variations in primate mating systems and the logic behind them.

Many female primates advertise the time at which they are ovulating. In around 20 per cent of primate species, the hind parts of the female swell and change to a bright pink colour at the time she is fertile and receptive to males.

Humans, like some other primates, have evolved to conceal the time of ovulation and to have sex outside the time at which they are fertile. There are several possible advantages to this system. One is that it makes males less sure of paternity. If ovulation is clearly advertised, then one dominant male can monopolise each female throughout her receptive period and be sure of fathering the children of each of them. On the other hand, the human system leaves room for doubt and enables females to accumulate several possible fathers, all of whom might help bring up or at least protect any children.

Primate mating systems are varied and a simple way of thinking about some of the tensions in them is to ask: "For a female is it better to be one of many wives of the top male (and share his resources), or to have one (or more) ordinary husbands, each of whom thinks he is the father of your children?"
One solution could, of course, be to take your child's genes from the top male while convincing another male that he is the father. The relatively high percentage of children in Western societies whose real father is not the person they think might suggest that humans have not entirely escaped their evolutionary past (and given a boost to the DNA testing industry).
What has this to do with menstrual synchronicity? Menstrual synchronicity might have been an earlier solution to the same type of problem. If we go back to a time before concealed ovulation evolved in humans, then there could be an advantage for females that ovulated at the same time as others in the same group.

Synchronous ovulation would make it more difficult for a dominant male to mate successfully with all the females. Those who mated with other males would be more likely to get undivided help in providing for children. That, at least, is one among many lines of speculation. If true, it would suggest menstrual synchronicity is indeed a relic from our evolutionary past.