Women's faces get redder at ovulation, but human eyes can't pick up on it

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Credit: George Hodan/public domain

Previous studies have shown that men find female faces more attractive when the women are ovulating, but the visual clues that allow this are unclear. Now, new research investigating whether it might be to do with subtle changes in skin colour has shown that women's faces do increase in redness during ovulation, but the levels of change are just under the detectable range of the human eye.

Researchers say this may mean that facial redness in females was once an involuntary signal for optimal fertility, but has since been "dampened" by evolution as it is more beneficial for females to hide or control outward signs of peak fertility.

Involuntarily signalling ovulation can prevent longer-term investment from males. In primate species that advertise ovulation, males only express sexual interest in females when they appear to be fertile. In humans, ovulation is less conspicuous and sexual behaviour is not restricted to the period of peak fertility.

The research, published today in the open-access journal *PLOS ONE*, is the most complete objective study of female faces during the ovulatory cycle, say researchers. Twenty-two women were photographed without make-up at the same time every working day for at least one month in the same environment and using a scientific camera modified to more accurately capture colour (usually used for studying camouflage in wildlife).

A computer programme was designed to select an identical patch of cheek from each photograph. The participants also self-tested for hormone changes at key times dictated by the research team's "period maths".

A surge in luteinising hormone told researchers that ovulation would occur in roughly the next 24 hours, so they knew which photographs were taken when the women were most fertile. The team converted the imagery into red/green/blue (RGB) values to measure colour levels and changes.

They found that redness varied significantly across the ovulatory cycle, peaking at ovulation and remaining high during the latter stages of the cycle after oestrogen levels have fallen. Skin redness then dips

considerably once menstruation begins. The research suggests facial redness closely maps fluctuations in body temperature during the cycle.

However, when running the results through models of human visual perception, the largest average difference in redness was 0.6 units. A change of 2.2 units are needed to be detectable to the naked human eye.

"Women don't advertise ovulation, but they do seem to leak information about it, as studies have shown they are seen as more attractive by men when ovulating," said Dr Hannah Rowland, from the University of Cambridge's Zoology Department, who led the study with Dr Robert Burriss, a psychologist from Northumbria University.

"We had thought facial skin colour might be an outward signal for ovulation, as it is in other primates, but this study shows facial redness is not what men are picking up on - although it could be a small piece of a much larger puzzle," she said.

Primates, including humans, are attracted to red, say the study's authors. Women may subconsciously augment the naturally-occurring facial redness during ovulation through make-up such as blusher or red clothing, they say.

"As far back as the 1970s, scientists were speculating that involuntary signals of fertility such as skin colour changes might be replaced with voluntary signals, such as clothing and behaviour," said Burriss. "Some species of primate advertise their fertility through changes in the colour of their faces. Even if humans once advertised ovulation in this way, it appears that we don't anymore."

It may be that, during ovulation, women have a greater propensity for blushing when around men they find attractive, say the researchers. "Other research has shown that when women are in the fertile phase of

their cycle they are more flirtatious and their pupils dilate more readily, but only when they are thinking about or interacting with attractive men," said Burriss. "We will need to do more research to find out if skin redness changes in the same way".

Rowland and Burriss first conceived of the experiment seven years ago, but it wasn't until Rowland arrived at Cambridge that they were able to do the research, thanks to the University's collegiate system. "We were able to recruit undergraduates in a number of colleges and photograph the women just before they had dinner in the college hall every evening. The collegiate routines and networks were vital to collecting data with such regularity," said Rowland.

More information: Changes in Women's Facial Skin Color Over the Ovulatory Cycle are Not Detectable by the Human Visual System, *PLOS ONE*, 2015.

Provided by University of Cambridge