Re: Why are blue cones rare in humans?

Source: http://sci.tech−archive.net/Archive/sci.anthropology.paleo/2007−01/msg00243.html

- *From*: vincent@xxxxxxxxxxxxxx (pete)
- *Date*: 24 Jan 2007 03:13:19 GMT

on Mon, 22 Jan 2007 23:20:23 −0600, deowll <deowll@xxxxxxxxxxxxx> sez:

> "pete" <vincent@xxxxxxxxxxxxxx> wrote in message
> news:ep3rb6$9ek$2@xxxxxxxxxxxxxxxxxxxxxxxxx
>
> > on 20 Jan 2007 08:29:53 −0800, John Roth <JohnRoth1@xxxxxxxxxxxx>
> > sez:
> >
> > > Marc Verhaegen wrote:
> > >
> > > > http://www.newscientist.com/article.ns?id=dn664
> > >
> > > Uh, Marc − blue cones aren't rare in humans. The most
> > > prevalant form of color blindness is due to a loss of one
> > > of the red cones, and that's because the gene is on the
> > > X chromosome.
> > >
> > > http://en.wikipedia.org/wiki/Color_vision
> > >
> > > Color vision is interesting. It turns out that mammals
> > > in general only have two types of cone while reptiles,
> > > insects and birds have four. Somehow, early mammals
> > > lost two of them. Why? No idea.
> > >
> > > Old world monkeys picked up a third type, while new
> > > world monkeys didn't.

> Lots of animals have cones that are sensitive to different parts of the spectrum. Pictures of how the world actually looks to various species of bird can be fascinating: there's a fairly famous picture of a black−eyed Susan (a kind of flower)
> that shows a band around the outside that's only visible in the ultra−violet. Trying to figure out what various birds and other animals actually see is a current (if somewhat minor) research topic.
>
> There are a few people with four varieties of cone. What I find amazing is that their brains get properly wired to handle
> four color vision.
>
> Do you have a reference for that? I confess I find it rather hard to believe − it suggests there are people around who see colours the rest of us don't get to experience. They'd get to invent their own names for them...
>
> Some people also have an extra gene for the color green and yes people seem to be rather more variable in color vision than might be expected. Why don't you just google it?

I've read extensively on colour vision, and never encountered it, though I'll admit that it's been a few decades. It would be useful to at least have some good working terms before embarking on a websearch.

....I found this, from Wiki ("tetrachromat/acy" seems to be the term required):

"Tetrachromacy has not yet been discovered in any mammals, though it is likely that it occurs in some birds, fish, amphibians, reptiles, arachnids and insects. Humans and closely related primates normally have three types of cone cells and are therefore trichromats (Animals with three different cones). However, at low light intensities the rod cells may contribute to color vision, giving a small region of tetrachromacy in the color space.[citation needed]

"It has been suggested that women who are carriers for variant cone pigments may be born as full tetrachromats, having four different simultaneously functioning kinds of cones to pick up different colors.[1] However, this has not been confirmed by experiments yet."

That article also provides this interesting link:

http://www.cs.utk.edu/~evers/documents/tetraChromat.txt

From Nov 2000. It includes the following text:

"For years now, scientists have known that some fraction of women have four different cone photopigments in their retinas. The question still remains, however, whether any of these females have the neural circuitry that enables them to enjoy a different −− surely richer −− visual experience than the common run of humanity sees."

I also found this article, dated sept 2006, which has some interesting anecdotal accounts, but also includes the following text:

"Finding tetrachromats through genetic screening is one thing. Proving they can see tens of millions of additional colors is another.

"One research group that believes it has identified a true tetrachromat is headed by Gabriele Jordan of Newcastle University in Great Britain.

[...]

"She is now conducting genetic tests on the woman's saliva to verify whether she has the genes for distinct red cones."

I conclude from this that if there is any demonstration of a richer visual experience, it is very recent, ie, only the last couple of months.

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Disclaimer: all I know I learned from reading Usenet.
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