Re: A fully developed creature can evolve?

Source: http://sci.tech−archive.net/Archive/sci.bio.evolution/2005−09/msg00304.html

- *From*: "Anon." <bob.ohara@xxxxxxxxxxxxxxxx>
- *Date*: Tue, 13 Sep 2005 23:20:32 −0400 (EDT)

g wrote:
> "Perplexed in Peoria" <jimmenegay@xxxxxxxxxxxxx> wrote in message
> news:dfv7s3$2g9d$1@xxxxxxxxxxxxxxxxxxxxxx
>
>>"Artificer" <eliezerfigueroa@xxxxxxxxx> wrote in message
>>news:dftqi4$20bh$1@xxxxxxxxxxxxxxxxxxxxx
>>
>>>I have a curiosity!. A fully developed creature like an adult human
>>>being is likely to suffer minor genetics (evolutionary) changes during
>>>its live or the genetic deviation from the parents always occur during
>>>de conception and formation of the creature? This question is about
>>>complex creatures not for bacterial organisms!
>>
>>I'm not sure what you mean by "minor genetics (evolutionary) changes".
>>I'm going to assume that you mean mutations.
>>
>>Well, the usual assumption is that a mutation happens in a single cell.
>>If a mutation happens in a single cell of an adult, it will probably
>>not do much for/to him. Well, if it happens in a type of cell that
>>divides frequently it may have some effect − it it happens in a white
>>blood cell it could conceivably confer immunity to AIDS, but more likely
>>will cause leukemia.
>>
>>But whatever it does to the adult, it won't have an important evolutionary
>>impact unless it can be passed on to the children. And it can't. Unless,
>>that is, the mutation happens in a 'germ line' cell destined to become
>>a sperm or egg. That can be passed on. In fact, most mutations happen in
>>the parent before sex, rather than in the fertilized egg after sex. But
>>such mutations in the parent probably won't have much effect on the
>>parent.
>
>
> Art,
>
> There was a man in Finland, a few generations ago, who −− it has been
> verified −−
> had a mutation in a 'germ line' cell 'destined to become a sperm, which
> resulted in
> an equivalent of a 'typo error' in the copying of his DNA. One letter got

> substituted for another letter.
>
> The resulting DNA change went to all his offspring and has been passed from
> them to all their offspring,

All? Only half (give or take) of his offspring, so probably slightly
more than a quarter of theirs.

> etc., every generation since. The altered allele (an allele is a code
> sequence in the DNA that influences certain protein foldings in such a way
> as to result in observable traits) was in a zone which impacts
> pulmonary auto−immune function. It was recessive (meaning that unless a
> descendant got it from both parents, it did not get expressed).
>
> Despite the fact there was not the sophistication we have today about DNA,
> researchers were able to trace back to find a common relative, and to work
> out mathematically where the gene came from. (Just hitting the high points
> here.)
>
> It is important to understand that, in a population there can be thousands
> of people who share a common relative. This is not speculative. It is
> established fact. Lots and lots of Finns are third, fourth, fifth, sixth...
> cousins, due to the fact the country was relatively stable for many, many
> generations.
>
And also that Kusta Vaasa wanted to keep the Russians out of Finland, so
he persuaded the Finns to move into central and eastern Finland. That
created a bottleneck, through which several genetic diseases squeezed.
I would have thought that any inbreeding after that was more a result of
the economics: the Finns were mainly farmers and woodsmen, and the
country isn't heavily industrialised (Nokia used to be based around
supplying the timber industry: indeed, they still make rubber boots).

THe stability meant that there are some good historical records, which
are being used by several groups in Finland to look at evolution of
pre−industrial human populations.

> Because of this, genetic counseling is given to most young couples before
> they marry. The likelihood is very much higher there, that one or more
> genetic abnormalities will occur there, because the statistical likelihood
> of a couple's BOTH having the recessive gene for the particular trait traced
> back to the individual mentioned above, passed on by the one individual
> mentioned above, or both having some OTHER pairing of a set of some of the
> more than fifty known "bad" recessive genes common in the population of
> Finland, is extraordinarily high there.
>
I thought 50 was too high: it's actually about 35:
<http://www.hus.fi/default.asp?path=59;404;4024;4582&print=1>

The Finns seem quite proud of their genetic heritage. And one of the
great things about working here is that they are very good scientists,

so they can utilise their heritage.

> More attention is given by medical and anthropological genetic researchers
> to "bad" genes than to "advantageous" genes.
>
> Hopefully that will not always be true, but so far, where there is money for
> devoting to research, it has seemed more important to find out why people
> with certain alleles tend to die young of cardio−vascular problems, or have
> type one, or type two, diabetes, or be born with kidneys that will fail
> early in life, or are mentally retarded... than to seek to identify alleles
> that result in, say, genius−level IQ, or who are superstar athletes, or who
> go through adolescence with no zits.
>
> I don't know if this answers your question. It is aimed only at giving you
> a glimpse of what goes on with
> mutations.
>
> In the case of three hundred years or so in Finland, the "beneficial"
> mutations may not seem to explain much about how populations can accumulate
> changes −− good, bad or indifferent. Multiply that by a million years, and
> you begin to get a feel for how changes can add to changes which add to
> changes... giving advantages to some and disadvantages to others and how...
> over millions of years... these take on increasing significance.
>
But the Finns are exceptional (in many ways), and over time the genetic diseases should work themselves out of the population. And any beneficial mutations will have changed in frequency to roughly the same extent.

With a population that is extensively sub−structured, natural selection may not have enough of an effect to be able to purge bad alleles. I mention this partly because a couple of the good empirical work showing this was done in Finland: on butterflies and Daphnia.

Bob

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- ***Follow−Ups***:
  - ***Re: A fully developed creature can evolve?***
    - ◊ *From:* g
  - ***Re: A fully developed creature can evolve?***
    - ◊ *From:* Perplexed in Peoria

- ***References***:
  - ***A fully developed creature can evolve?***
    - ◊ *From:* Artificer
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- Prev by Date: ***Re: Most important paper in evolutionary biology***
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