

## Re: Shall we get rid of our junk?

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*Source:* <http://sci.tech--archive.net/Archive/sci.bio.evolution/2005-12/msg00240.html>

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- *From:* "Jim McGinn" <[jimmcginn@xxxxxxxxxxxxxx](mailto:jimmcginn@xxxxxxxxxxxxxx)>
  - *Date:* Mon, 19 Dec 2005 12:26:43 -0500 (EST)
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"Perplexed in Peoria" <[jimmenegay@xxxxxxxxxxxxxx](mailto:jimmenegay@xxxxxxxxxxxxxx)> wrote in message  
[news:do5a9h\\$1778\\$1@xxxxxxxxxxxxxx](mailto:news:do5a9h$1778$1@xxxxxxxxxxxxxx)

>

> "Larry Moran" <[lamoran@xxxxxxxxxxxxxx](mailto:lamoran@xxxxxxxxxxxxxx)> wrote in message

> [news:do24k2\\$4eu\\$1@xxxxxxxxxxxxxx](mailto:news:do24k2$4eu$1@xxxxxxxxxxxxxx)

>> On Fri, 16 Dec 2005 16:51:23 -0500 (EST),

>> Perplexed in Peoria <[jimmenegay@xxxxxxxxxxxxxx](mailto:jimmenegay@xxxxxxxxxxxxxx)> wrote:

>>

>> [If there is a selective explanation for 'junk DNA', would it  
> require species-level selection?]

>>

>>> It seems that there are three selective forces that must be  
>>> considered:

>>>

>>> 1. Presumably there is a small negative fitness effect on  
>>> individuals who carry a lot of junk because of the metabolic  
>>> cost of replicating the junk.

>>>

>>> This is probably correct but the effect must be very small in  
>>> those species that can tolerate large amounts of junk DNA.

>>>

>>> 2. In a sexual population (and the question is meaningless if  
>>> the population is not sexual) there is presumably a negative  
>>> fitness effect on any individual who carries a different  
>>> pattern of junk than do his potential mates. This is because  
>>> the chromosomes will not be quite so homologous and this will  
>>> interfere with recombination and perhaps even with mitotic  
>>> segregation.

>>>

>>> The differences between individual chromosomes are insignificant.

>>>

>>> It is not clear what you are saying here. If are just pointing out  
>>> that in all successfully reproducing species, the two homologous  
>>> chromosomes have the same pattern of junk, I certainly agree. Most  
>>> individuals are homozygous for the junk pattern. We might seek  
>>> a selective explanation for this, or we might attribute it to  
>>> drift. I was suggesting some reasons to think that it might be  
>>> selective.

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>  
> But this should have been obvious to you. So perhaps you had a  
> different meaning in mind. Clarification is welcome.  
>  
>> [snip]  
>>  
>>> 3. Finally we are presuming that beneficial mutations arise more  
>>> frequently in high-junk individuals.  
>>  
>> There is no evidence to support this assumption and no obvious  
>> reason why it has to be invoked, other than looking for  
>> adaptationist explanations of junk DNA. If you believe that  
>> nature is "designed" by natural selection then junk DNA is a big  
>> problem. If you believe that accident plays a large role in the  
>> history of life then junk DNA is confirmation.  
>>  
>> Most of the current "controversy" comes from hard-core  
>> adaptationists. They just can't accept the idea that a large amount  
>> of evolution may not be due to natural selection. It goes against  
>> everything that they stand for so they make up just-so stories  
>> to explain the selective advantage of junk DNA. (Or, they claim  
>> that there's some secret selective advantage that we haven't yet  
>> discovered after 35 years of looking.)  
>  
> I tend to agree. Most likely, junk is junk. But the question arises:  
> If there IS a selective explanation, would it require selection at  
> a higher level than the individual? That is the question I was trying  
> to get Joe's feedback on.  
>  
>

Well, yes, of course. We'd, in this instance, view it--the unit of selection--as the lineage. The idea being that lineages that don't have "junk" DNA would be more likely to go extinct during periods of stress in that they'd be less able to achieve "new" adaptations quickly. Accordingly we can view "junk" DNA as a lineage level adaptation, IMO.

Jim

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• *Follow-Ups:*

◆ *Lineage as unit of selection – was: Shall we get rid of our junk?*

◇ *From:* Perplexed in Peoria

• *References:*

◆ *Shall we get rid of our junk?*

◇ *From:* whitesickle@xxxxxxx

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- ◆ **Re: Shall we get rid of our junk?**  
◇ From: Jim Kent
- ◆ **Re: Shall we get rid of our junk?**  
◇ From: Joe Felsenstein
- ◆ **Re: Shall we get rid of our junk?**  
◇ From: Perplexed in Peoria
- ◆ **Re: Shall we get rid of our junk?**  
◇ From: Larry Moran
- ◆ **Re: Shall we get rid of our junk?**  
◇ From: Perplexed in Peoria

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