Re: Article: On the Origins of Chemical Biodefense

Source: http://sci.tech−archive.net/Archive/sci.bio.evolution/2005−10/msg00526.html

- *From*: Tim Tyler <tim@xxxxxxxxxxx>

- *Date*: Mon, 17 Oct 2005 14:15:46 −0400 (EDT)

jimmenegay@xxxxxxxxxxxxx wrote or quoted:
> Larry Moran wrote:
> > On Sun, 16 Oct 2005 01:41:04 −0400 (EDT),
> > Robert Karl Stonjek <rstonjek@xxxxxxxxxxxxxx> wrote:

> > > On the Origins of Chemical Biodefense
> > >
> > > The following points are made by R. Liddington and L. Bankston
> > > (Nature 2005 437:484):
> >
> > [snip]
> >
> > > Random mutations occurring over hundreds of millions of years mean
> > > that the component amino−acid sequences of individual domains no
> > > longer share any similarity; nevertheless, their evolutionary origin
> > > is preserved in their three−dimensional structure.
> >
> > The other possibiity is that the motifs/domains in different
> > proteins do not share a common ancestor. Their structural similarity
> > is due to convergence on a common structural motif. In that case,
> > the absence of any sequence similarity is evidence that they are not
> > evolutionarily related.
> >
> > There is a controversy in the field of molecular evolution. Some
> > people, like me, believe that convergence explains many common
> > sequence motifs. We believe it's very unlikely that all traces
> > of sequence similarity could be lost in regions that must preserve
> > structural integrity while randomly changing all the amino acids
> > in order to wipe out sequence similarity. That just doesn't make
> > a lot of sense.
> >
> > Others believe that structural similarity trumps sequence similarity
> > when it comes to making decisions about homology. Those people
> > believe that all similar structures have evolved from a common
> > ancestor. In extreme cases they'll even argue that all zinc
> > fingers and all leucine zippers are homologous.
>
> Interesting. Could you recommend a review article that discusses
> this controversy? Most of the things I have read say that

> structure is more strongly conserved than sequence and hence
> that structural alignment should guide sequence alignment. I
> had never really considered the possibility of structural
> convergence.

A book on convergence that you might not otherwise get
recommended is Conway Morris's "Life's Solution".
Convergence is illustrated with numerous diagrams.

> But ISTM that 'convergence' is not really a good word for the
> hypothesis. There is no 'gradualism' in the structural
> evolution, is there? The two polymers may evolve to the same
> structure, but they don't really 'converge' upon that structure.

Sure they can − just as two designers might have come up
with the idea of making a suspension bridge.

I can't see what the problem is there.
−−

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|im |yler http://timtyler.org/ tim@xxxxxxxxxx Remove lock to reply.

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- ***Follow−Ups***:
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    - ◊ *From:* Robert Karl Stonjek
  - ♦ ***Re: Article: On the Origins of Chemical Biodefense***
    - ◊ *From:* jimmenegay

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