Devolution: Re-runs of *Genesis 3* ?

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A mischievous assumption has been promoted, more & more over the past decade or so: that if evolution were shown to have occurred – *i.e* proven to be a fact regardless of whether its mechanism had been adequately discovered – that fact would somehow clash with Christian theology as set forth in the creation stories (*pl*.) of *Gen. 1-2*. The sectarian campaigns on this assumption are of two varieties - both holding that all species were created within a short time, either about 6,000 y ago (Young Earth "Creationism") or some billions of y ago (Old Earth "Creationism"). In both versions, extinctions have occurred but no new species have emerged; evolution is asserted to be a lie.

It's an amusing irony that a fashionable tendency among militant atheists, exemplified by the dreaded Dawkins, also holds that evolution, if a fact, refutes religion.

They are both wrong - and wrong in different ways but which I will characterise as, both, totalitarian.

In order to maximise our chances to foresee the future, we had better have a good grasp of the past. My glimpses today of possible de-volution are based on a scientific description of evolution. The 'tree of life' consists of branching boughs, but also of a smaller number of snapped twigs which have fallen across by transposons of various types to graft onto distant branches in processes generally termed 'horizontal gene transfer'. Transposons have dominated recent evolution, *e.g.* structures such as compound leaf, or the leghaemoglobin found in nodules of legumes' roots, or the mammalian type of eye, have not evolved independently in many different phylogenetic lines but have been passed across the tree by transposons of one sort or another.

If we change the rates, or even worse the specificities, with which genes can jump around in infectious manners, we may wreak biological havoc on a global scale. Go back to Ovid's *Metamorphoses* to glimpse what might go wrong. The most severe threat is novel pathogens, especially viruses; but today I'll talk mainly about GM-plants which are the most widely-deployed GM-organisms (GMOs). The abbreviations are equivalent - GE or GM.

I hold a traditional view of The Fall (insofar as I can understand it). And I maintain that those who ignore that doctrine are at risk of repeating in novel ways the rebellion against God which is the essence of The Fall. Of course, there can never be a re-run of The Fall; but humans can be tempted to novel misbehaviours similar in kind. I will argue that gene-tampering should offend well-informed

Christians as an interference with evolution of a kind similar to the Fall of *Gen. 3* and liable to bring about devolution - novel mayhem in the biosphere.

A wide range of scientists should speak out for much stricter control of gene-tampering because it is based on dud science, quite aside from its highly dubious ethics.

Prof Richard Strohman pointed out, in a sporadic small series of articles in *Nature Biotech*, many defects in the Lego model of biology which 'informs' the gene-tampering trade. Dogma long refuted is crucial among the axioms of the gene-jiggerers, *e.g*

- "one gene one protein",
- "only 4 letters in the DNA code",
- "randomness becomes utmost precision as we slam in synthetic nucleic acids by weapons-grade biolistics",
- etc.

The main characteristic of this set of slogans is that they are scientific drivel. The Schubert Letter (*Nat Biotech* Oct 2002 p. 969) provided a brief outline of reasons why GM-food is not a safe option.

Th methods whereby current GM-plants were created are of two types. Mainly for dicotyledons, synthetic DNA containing viral genes and the desired structural gene is spliced into modified copies of the T-plasmid of *Agrobacterium tumefaciens*, which in nature causes the only known tumour of the plant kingdom. In a novel process vaguely reminiscent of viral infection, this foreign 'cassette' can get incorporated into the DNA of a plant cell in culture, which can then be grown into a whole plant. The other method, more favoured for monocotyledons such as maize, is 'biolistics': onto a lawn of cultured plant cells, a tiny puff of helium blows midget shotgun pellets, much smaller than the plant cell, coated with the synthetic DNA cassettes.

The idea that slapping in - randomly ! - a few genes by radically unnatural processes will have more predictable effects than offering a whole genome of tens or hundreds of thousands of genes in breeding is wrong for the main reason that it assumes natural crosses to be random or nearly so. We know, admittedly, very little about the natural barriers to error in breeding; that does not prove they're unreal or random. A top-level affirmation of the false randomness assumption was stated by main Monsanto-connected gene-jockeys Roger Beachy et bulk in their (*Nat Biotech* Nov 2002) 'enraged' response to the Schubert Letter:-

> ' The reality is that "unintentional consequences" are much more likely to occur in nature than in biotechnology because nature relies on the unintentional consequences of blind random genetic mutation and rearrangement to produce adaptive phenotypic results, whereas GM technology employs precise, specific, and rationally designed genetic modification toward a specific engineering goal. '

The immediate response to this furphy is that there's almost nothing random in nature. A gene-jockey of plants, Professor Patrick Brown, has made this and related points at www.psrast.org.

What is so precise, specific, or rational about GM as done so far? The answer is, very little indeed. Its outcomes are inherently unpredictable. The tiny minority of target cells that both survive and have incorporated somewhere in the genome the desired gene cassette will, in general, also develop other unforeseeable properties, *e.g* deviant metabolism generating toxins or allergens.

I now outline of a clear example of such effects.

THE THALIDOMIDE OF GENETIC 'ENGINEERING'

L R B Mann, D Straton & W E Crist

By the end of the 1980s some millions of people, mostly in North America, were supplementing their diet with L-tryptophan, an essential amino-acid present in proteins of any normal diet. Amino-acids such as tryptophan are routinely produced in micro-breweries using suitable microbial cultures. One producer, Showa Denko K.K., artificially inserted genes into a bacterial species to increase its production of tryptophan.

Then in late 1989, some 5,000 - 10,000 in North America fell ill with a highly unusual illness, EMS (eosinophilia-myalgia syndrome), caused by Showa Denko tryptophan. Within months, dozens had been killed by EMS and thousands maimed. Today thousands continue to suffer permanent nasty effects, and a trickle of them continue to die early (totalling at least 80 by now in the USA). The epidemic ceased when over-the-counter tryptophan was severely restricted.

Two cases were reported in Australia, and one in New Zealand. The tryptophan those patients took was not traced to manufacturer.

The total killed is not exactly known but may be in the region of a few hundred. Showa Denko has paid around US$2,000,000,000 to avoid damages trials.

We emphasize that if thalidomide had happened to cause a type of birth defect that was already common, *e.g*. cleft palate or severe mental retardation, we would still not know about the harm, and pregnant women would have kept on taking it for its undoubted benefits. The fractional addition to figures that were already relatively large would not have been *statistically* significant. But as it turned out, the damage noticed was of a kind that most doctors never see in a whole career - drastic malformations of the arms & legs - so although the numbers were not huge these cases were picked up.

Similarly, impurities in Showa Denko's genetically 'engineered' (GE) tryptophan happened to cause an illness - EMS - which was novel. The surge of numbers therefore stood out and got noticed. If SDKK's poison had caused the same numbers of a common illness instead, say asthma, we would still not know about it.

Or if it had caused delayed harm, such as cancer 20 - 30 years later, or senile dementia in some whose mothers had taken it early in pregnancy, there would have been no way to attribute the harm to the cause.

This reminds us of the need for extreme caution with GE foods. They must be assumed guilty until thorough tests have suggested they are, if not innocent, at worst guilty of only minor dangers. Such is nowhere near the case today as large companies rush to market their GE foods.

It is very disappointing to find a leading physician writing on behalf of the RSNZ about this disaster thus: "Rare cases of EMS were known before the introduction of the genetically engineered bacterium, which further supports the hypothesis that EMS is not due to the genetic engineering event." An exact analogue of that argument would run: "Rare cases of seal-limb were known before the introduction of thalidomide, which further supports the hypothesis that seal-limb is not due to thalidomide."

But even more important is the fact that the trickle of about 100 early EMS cases, years before the epidemic of late 1989, were due to (early versions of) Showa Denko GE bacterial cultures.

None of the half-dozen other manufacturers' tryptophan caused EMS. No other manufacturer used gene-splicing to produce tryptophan.

The contrast is startling with the elaborate procedure before registration of a new drug. It has taken a decade to get legal approval for supplementing humans with (a modified version of) the human hormone amylin, for treating diabetics. Yet GE foods are urged for legal distribution in great haste and with only extremely scanty testing, and the main discussion so far has been whether they should be labelled.

Labelling would not in itself be wrong, but can of course not substitute for the careful lengthy testing that would be needed before any GE food should be approved for human consumption. Labelling of GE food would imply acceptance by authorities, as does the ingredient list of any labelled food.

The Showa Denko disaster is crucial to understanding GE food. If a purified single chemical - the natural amino-acid L-tryptophan, better than 99% pure and definitely satisfying the notorious 'substantial equivalence' test - can turn out when GE'd to kill a hundred or so and cripple thousands, what will it take to check properly a potato expressing a synthetic 'exact' copy of a gene for a toxin from the African clawed toad?

And most urgently, the attempt to count purified amino-acids, sugars, oils etc. as 'substantially equivalent' is shown by the Showa Denko disaster to be a gamble. The assumption that soy oil from GE soybeans is exactly equivalent to ordinary soy oil requires the most careful scientific measurements to check it. Merely assuming 'substantial equivalence' will not do.

Those who search the Internet on this topic will soon discover the claim by apologists for GE that the problem was only decreased purification of tryptophan. We disagree for several reasons - mainly, the first three GE strains had been causing EMS

(about 100 cases) for years before this slackening of purification procedure in Jan 1989 when also the 'superproducer' strain went into production and caused the epidemic. But this question cannot be settled with finality unless Showa Denko releases the GE microbes for detailed examination.

Whether you believe the impurities were due to incompetent purification & monitoring, or to deviant metabolism in the GE-bugs, or both, you had better believe that the fabled 'substantially equivalent' assumption flopped in that epidemic of crippling and lethal illness.

Although GE proponents claim that the EMS epidemic was caused solely by faulty filtering, it is possible to question their seriousness. None of them has publicly argued that the Health Food supplement industry should be subject to legal controls for purity & efficacy comparable to those applied to the pharmaceutical industry; yet this would be logical if indeed such a deadly epidemic occurred solely as a result of inadequate purification in manufacturing.

Either way, biotechnology - which includes GE but also includes other processes such as purifying the mixture "lyprinol" from mussels - requires much-enhanced scrutiny.

Main sources

1. L-Tryptophan Puzzle Takes New Twist, *Science 249*, 988, 31 August 1990
2. Does Medical Mystery Threaten Biotech? *Science 250*, 619, 2 November 1990
3. EMS and Tryptophan Production: A Cautionary Tale, *Trends in Biotech 12* : 346-352, Sept 1994
4. Eosinophilia-myalgia syndrome. Results of national surveillance, *J Am Med Assoc 264*: 1698-703 1990
5. Tryptophan produced by Showa Denko and epidemic eosinophilia-myalgia syndrome. *J Rheumatol 46* Suppl 1996. 81-91.
6. Toxic L-tryptophan: Shedding Light on a Mysterious Epidemic. by William E. Crist. http://www.seedsofdeception.com/Public/Ltryptophan/1Introduction/index.cfm

Dr Mann <robtmann7@gmail.com>, a biochemist, served for its first dozen years on the Toxic Substances Board advising successive New Zealand Ministers of Health on poisons.
Dr Straton is a psychiatrist who has taken a special interest in therapeutic uses of tryptophan.
Mr Crist is a publicist who has interviewed researchers, victims, and lawyers involved with EMS.

This article is available at http://www.connectotel.com/gmfood/trypto.html. It is updated from *Soil & Health* Aug 1999. I lead an international team of experts which has compiled a thorough review of the open literature on this disaster; the obvious

journals that could publish such an account have serially rejected it like a mortar bomb (no sending to referees).

Nature is extremely orderly. It is complex, but not like a bowl of alphabet soup; nature - especially life - is systematic. This should be agreed by all scientists, even atheists; of course, theists ascribe the systematic order to design, but those who resist belief in design will, I hope, agree nature to be systematically orderly. That is indeed an assumption of all science, whether conducted by atheists, theists, deists, or agnostics; the regularity of scientific laws is a common assumption. If you think, like Dawkins, that nature is just the result of the outworkings of physics & chemistry, then you could fairly easily assume that even randomly inserting 'cassettes' of genes from foreign kingdoms would be no more likely than breeding to cause harm. If on the other hand you believe (to take a specific case) that an apple is not just a random collection of biochemicals but a creation of a benign Creator, and that Grandmother Smith in a Sydney suburb was a humble agent of that Creator (selecting a new mutant that had arrived according to His rules), then you will contrast such natural processes with the overwhelming of natural barriers to slam in viral promoters joined onto synthetic approximate copies of bacterial genes by biolistics, or modified T-plasmids - violent processes expected to disrupt the target genome as it indeed turns out to do. Breeding entails natural protections from error which are overwhelmed by gene-tampering. One tawdry old argument we have heard since 1974 and can expect to hear again in all its flagrant deceit is the claim that gene transfers occur naturally so GM is only hastening them. This line of talk is a smoke-screen designed to obscure the fact that GM usually performs artificial transfers which are not believed to occur in nature. This fact is denied when possible harm is suggested, but is acknowledged, indeed emphasised, for claims of benefit. This dishonesty exemplifies the dominance in utterances about GM of the depraved trade of mercenary deceit, PR.

I tend to think it is on the ethical, and even theological, level that the issue really turns. For those who think so, re-reading of *Genesis 3* may be salutory.

In a culture that has largely turned away from the religion that gave rise to its legal principles, the ethics of gene-tampering is in drastic need of fundamental review. Gene-jiggering has already sucked in $10^11, and still only a few corporations have produced anything saleable (except those selling the enzyme kits etc for the gene-tampering expts). The science behind this commercial frenzy is junk; the Lego model of biology never looked promising and is now known to be wrong. Proper biology points to the Schubert Letter, and in response a gaggle of Monsanto stooges intones 'enragedly' the atheistic moronic rubbish quoted above.

Never in the history of science has a family of "technologies" been developed, and deployed on a commercial scale of $10^11, based on such junk science & theology as stated by Beachy *et al*.

The most dangerous technology of all history blunders on, little understood by venture-drongos and by ethicists. The good scientists like Pat Brown and David Schubert are crucially valuable. In our country, among the visible scientific critics are Profs Jack Heinemann (Canterbury) and Peter Wills (Auckland).

Never since the Nazi attempts to legitimize racism has science been so rapidly & severely degraded. Apologists for GM posing as defenders of true science - *e.g.* the political party ACT - are taking up an untenable, indeed ludicrous, stance.

But the ethical appraisal of GM is even more backward. In the late 1970s, soon after GM was invented, some RC bishops in N. America issued an ethical warning; what became of that strand of thought? In our country, an Anglican bishop, Richard Randerson, evoked great hopes when appointed as the ethicist on the Royal Commission on GM, but proved embarrassingly useless.

Among the worrying degradations of scholarship lately is the huge scale of fragmentation of what passes for scholarship. Leaving aside the pathetic attacks on logic and on morality by postmodernism, even those who acknowledge traditional reason usually feel no duty to allude to mainstream scholarship, and can sell bulk books referring only to their own recent allies. For instance, the ID theorists fail to refer to William Temple, or Sir Alister Hardy, or John Morton, or Rupert Sheldrake.

Much more importantly, If the human has no duties to a higher power, how can selfishness & greed be curbed? The religion that gave rise to the code of ethics claimed to be implemented, if imperfectly, in British & USA legal systems had better get involved in renewal of ethics. It is a major embarrassment to Christians that a bishop (of my denomination) contributed scarcely at all to the Royal Commission on GM, flagging away opportunities to discuss ethics in public hearings. A minor powerHarpie has set up tiny sandpits with pompous titles 'Interchurch Commission' etc but has produced nothing significant. As an Anglican I have said for a decade that the churches are the sleepers in the movement for control of GM. I hope & pray they will take GM much more seriously, and develop theological critiques of this dangerous gambling which bids fair to cause devolution.

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The best books are:-

Smith, Jeffrey. Genetic Roulette: the documented health risks of genetically engineered foods. Fairfield, Iowa: Yes! Books. 320pp. 2007

Heinemann, Jack. Hope not Hype: the future of agriculture guided by the International Assessment of Agricultural Knowledge, Science & Technology for Development (IAASTD). 160pp. Penang: Third World Network 2009

The best websites are:-

http://www.psrast.org
http://www.ucsusa.org
http://www.gmwatch.org