Report on the 2003 Biological Transmutation Research of Professor Biberian

By David Cuthbertson

In October 2003 Professor Jean Paul Biberian, from the Luminy University, Marseilles, was proud to announce the duplication of biological transmutation experiments with the marine bacteria *Marinobacter*. He is a materials physicist with an interest in 'condensed matternuclear reactions' (cold fusion) and with the experience, over the previous 4 years, of conducting preliminary transmutation experiments with germinating wheat, oats, *Lactobaccilus* and, most recently, the bacterium, *Marinobacter*.

Introduction

The transmutation of one chemical element into another under the influence of biological organisms has been recorded ever since the days ofthe alchemists. However, since Lavoisier at the very end of the 18th century such claims have been consistently rejected by mainstream science, mostly for theoretical reasons. It is interesting that the scientist, philosopher and mystic, Rudolf Steiner in the 5th of his (biodynamic) *Agriculture* lectures stated that such phenomenamay be measured using the 'purely external standards of analytical chemistry'. It was this indication (and the biological transmutation research of the 19th century chemist Herzeele) that inspired Professor Holleman (www.holleman.ch) to conduct his own research. After Holleman's death, the Professor Holleman Stichting was formed, whose aims are to further such research. As a result of contacting the Holleman Stichting, Biberian became the successful recipient of funds from the Dutch, *Stichting Triodos Fonds*. This enabled further exploratory experiments to beconducted.

Methods

With the help of experiencedmicrobiologist Dr. Valerie Michotey (Laboratoire de Microbiologie, de Geochemie et d'Ecologie Marines, CNRS-UMR 6117, Centre d'Oceanologie de Marseilles, Universite de la Mediteranee, Campus de Luminy, Case901, 13288 Marseilles cedex 9, France) the bacterial culture protocols were designed. The organism used was a *Marinobacter* species, strain CAB(DSM 11874), which originates from hydrocarbon-polluted marine coastal sediments (Lavera Gulf of Fos, France). It was chosen because Michotey was familiar with its culture (Rotani, J.-F., Gilewicz, M, Michotey, V., Tian Ling Zheng, Bonin, P. and Bertrand, J.-C. (1997) Aerobic and anaerobic metabolism of 6,10,14-trimethylpentadecan-2-one by a denitrifying bacterium isolated from marine sediments. Appl. Environ. Microbiol. 63, 636-643). The pre-culture was made in ASW (artificial seawater) medium: 11.7g/L NaCl, 7.85g/L $MgSO_4$, 0.75g/L KCl, 6.05g/L Tris, 3g/L NH_4Cl, 1.47g/L

$CaCl_2$, pH 7.5) supplemented with 5g/l yeast extract and 5g/L of bactopeptone. The strain was grown in aerobiosis at 30°C for 24h. One hundred µl of this pre-culture was used to inoculate 4 sterile plastic flasks containing 5 ml of ASW medium supplemented with sodium lactate (11 mM). For negative control, 2 flasks were frozen at -20°C. The other flasks were incubated at 30°C for 48h in order to allow the bacteria to grow. After 48h, 5 ml of nitric acid was added to all 4 flasks.

The bacterial cultures and their controls were analysed using ICP-MS (Inductively Coupled Plasma - Mass Spectrometry), which is one of the best methods for analysing a wide range of chemical elements. Mass spectra peaks for Li, B, Na, Mg, K, Ca, Mn, Fe, Cu, Zn, and Mo were measured, though not all for every sample.

Results

The following conclusions based on the analysis results have been drawn:

1. The experimental cultures, B1, B2, B3, and B4 after incubation for 48 hours, showed a high degree of variability not shown by the control bacteria T1, T2, T3 and T4 (figures 1 and 2, columns labelled "% diff within C1", "% diff within C2", and "% diff within E1", "% diff within E2"). Variation between the 2 nutrient samples for a range of 6 chemical elements (figure 1) and also between the 2 paired frozen bacterial samples for a range of 11 different chemical elements was approximately 10% (figure 2). The bacteria (plus, of course, the nutrient solution in which they grew), however, after 48 hours more growth, showed a variation of up to almost 90% between paired culture dishes (figure 2).
2. An approximately 100% increase in the measured mineral content from the pure nutrient solution to the frozen bacterial culture samples may possibly be, at least in part, due to the inoculated bacteria themselves containing a very high mineral concentration (figure 2).
3. Decreases in the amount of calcium, potassium, magnesium and sodium were noted by Biberian, which supported results from his earlier experiments. Biberian also noted increases in the transition metals. Such claims, however, should be considered as provisional. The high degree of variability demands that analyses from many more experimental cultures are required before any clear conclusions may be drawn.
4. Inexplicably, a further observation may be noted from the analysis of one pair of Biberian's *Marinobacter* experimental cultures (B3, B4), in relation to the nutrient solution (T7, T8) as shown in figures 3 and 4. Cultures B3 and B4 showed approximately equal but opposite differences from the average nutrient solution concentrations of each of 6 chemical elements. A simple explanation of material from sample B3 having been transferred to B4 is unlikely, for the recorded differences for each chemical element are not the same.

5. The magnesium value for T1 (figure 1, highlighted in red) appears to be anomalously low, possibly a typographical error (such as a missing digit, or misplaced decimal point); fortunately it does not significantly effect the results as a whole.
6. The elemental analysis recording the presence of lithium, boron, manganese, iron, copper, zinc, and molybdenum, though these were not explicitly stated as being present in the initial nutrient medium, does not necessarily require the occurrence of biological transmutations. Yeast extract in the nutrient medium will contain minerals, as will the bacteria used to start the culture. Unfortunately the analytical results given here are only relative values; to the best of my knowledge no absolute measurements/calculations were made. Nevertheless, it is likely that some of these may well be present in only trace amounts, potentially impurities that are often present in even the highest grade analytical chemicals, such as were recorded by Holleman in his transmutation experiments.
7. I have not received an explanation for the dilution of some of the samples with water, though for highly sensitive analytical equipment this is often required to prevent saturation of the output and thus maximise the sensitivity of the results.

Considerations

Because of the limited nature of these experiments, few conclusions can be made other than that a further intensive programme of research is required. Nevertheless, the high degree of variability observed for the experimental cultures is a feature that cannot be ignored. Professor Holleman found this to be a serious problem with his attempts to replicate the detailed experiments of the 19th century chemist Herzeele. Several questions arise:

1. Is this an artefact of the experimental conditions, indicating the possibility of a serious source of error, that requires a redesign of the experimental protocol?
2. Was the analysis method in error?
3. Or, is this the normal behaviour of such biological material, requiring a very large number of replicate samples such that patterns within the variability may be elucidated?

In considering the first question, one must always remember that even the simplest of bacteria are capable of an enormous repertoire of responses to varying environmental stimuli. They are capable of etching even the most chemically resistant of plastic or glass containers, turning heavy metals (such as mercury and lead) into gasses, chemically binding otherwise soluble toxins into the toughest of solid precipitates onto, or even into, the very fabric of the container walls, in ways that would be considered impossible for the relatively inert nutrient medium upon which they feed, thereby catching out even the most cautious analytical chemist or pathologist. Normally this is only of minor

importance, but in work such as this any deviations in chemical element concentration are crucial. Therefore, variation in results for such a relatively simple experiment, whilst not at all desirable, is to be expected.

Because of the huge variety and complexity of the chemical processes within living organisms, the possibility of error from the mass spectrometer falsely mistaking simple molecules for otherwise identical heavier chemical elements is always a possibility. An ICP-mass-spectrometer is designed to minimise such possibilities. However, errors are also possible with introduction of the sample into the spectrometer. The bacteria may not be evenly mixed throughout the culture flasks, and even if evenly spread throughout the flask, those in the centre may display a different biochemistry to those on the bottom, sides, or top of the culture. Also if a liquid sample was injected into the mass spectrometer, any insoluble precipitates may not find their way into the ionization chamber, or their distribution may be uneven.

The third consideration encompasses two furtherquestions. Firstly, as stated above, living organisms are highly complex, showing a dynamic response to a wide range of factors, including their past culture history. Thus even if the above errors are able to be discounted, future biological transmutation experiments would still be required to be repeated, many, many times, under subtly varying conditions. A single flask of bacteria contains millions of individual organisms that dynamically respond to not only their physical culture environment, but also, each individual bacteria responds to its living neighbours as well.

Finally, it should be remembered that chemical elements exist in different forms, known as *isotopes*. Future, more detailed experiments should therefore analyse not just for the chemical elements but their component isotopes as well. Most isotopes are extremely rare in nature and a record of their distribution in the nutrient solution, and bacterial cultures would add valuable information towards unravelling this extremely important, but challenging phenomenon. It is interesting to note that the best research to date, conducted by Vladimir Vysotskii, Alla Kornilova, et al., in Kiev and Moscow Universities, has conducted just such carefully controlled and analysed experiments looking for isotopic transmutations under the influence ofbacterial cultures, though, as yet, they too have had their results independently verified.

References

- V. I. Vysotskii, A. A. Kornilova, *Nuclear Fusion and Transmutation of Isotopes in Biological Systems, Moscow*, “Mir”, 2003.

Appendix

Biberian's reported results

Figure 1.

First Experiment – without dilution												
Element / wave-length	T1 nutrient +bact frozen	T2 nutrient +bact frozen	Average nutrient +bact frozen C1	% diff within C1	B1 nutrient +bact 30°C	B1 % diff from C1	B2 nutrient +bact 30°C	B2 % diff from C1	Average nutrient +bact 30°C E1	% diff within E1		Bact/ Blank
Zn 213	1.1E+4	1.1E+4	1.1E+4	1%	1.2E+4	11%	1.7E+4	55%	1.4E+4	16%		1.33
Fe 238	5.1E+3	5.3E+3	5.2E+3	2%	4.7E+3	-9%	1.5E+4	195%	9.9E+3	53%		1.93
Cu 327	3.3E+4	2.7E+4	3.0E+4	9%	5.6E+4	89%	4.7E+4	57%	5.2E+4	9%		1.73
Mn 260	1.6E+4	1.3E+4	1.4E+4	10%	3.5E+4	142%	2.2E+4	52%	2.8E+4	23%		1.97
Mn 257	1.5E+4	1.2E+4	1.4E+4	11%	3.4E+4	149%	2.1E+4	53%	2.8E+4	24%		2.01
Li 670	2.1E+5	1.9E+5	2.0E+5	5%	3.3E+5	65%	2.9E+5	43%	3.1E+5	7%		1.54
First Experiment – With a dilution of a factor 5 in water												
Element / wave-length	T1 nutrient +bact frozen	T2 nutrient +bact frozen	C1	% diff within C1	B1 nutrient +bact 30°C	B1 % diff from C1	B2 nutrient +bact 30°C	B2 % diff from C1	Average nutrient +bact 30°C E1	% diff within E1	water	Bact/ Blank
Mg 285	1.0E+6	1.0E+7	5.7E+6	82%	9.9E+6	76%	9.7E+6	71%	9.8E+6	1%	1.5E+4	0.95
Na 330	8.8E+4	8.8E+4	8.8E+4	0%	8.0E+4	-9%	8.0E+4	-9%	8.0E+4	0%	9.5E+3	0.9
K 766	2.9E+6	2.9E+6	2.9E+6	0%	2.6E+6	-11%	2.5E+6	-12%	2.5E+6	1%	5.4E+4	0.88
Fe 238	2.7E+3	2.7E+3	2.7E+3	0%	2.7E+3	1%	5.0E+3	86%	3.9E+3	30%	1.7E+3	1.58
Fe 239	2.8E+3	2.8E+3	2.8E+3	0%	2.9E+3	3%	4.7E+3	70%	3.8E+3	25%	1.8E+3	1.49

Figure 2.

Second Experiment

Ele-ment/ wave-length	T7 nutrient only	T8 nutrient only	Average nutrient only N2	% diff with-in N2	T3 nutrient +bact frozen	T3 % diff from N2	T4 nutrient +bact frozen	T4 % diff from N2	Average nutrient +bact frozen C2	% diff with-in C2	B3 nutrient +bact 30°C	B3 % diff from N2	B3 % diff from C2	B4 nutrient +bact 30°C	B4 % diff from N2	B4 % diff from C2	Average nutrient +bact 30°C E2	N2-E2 /N2	% diff within E2
Mg 285	9.4E+6	1.3E+7	1.1E+7	16%	2.2E+7	92%	2.1E+7	86%	2.1E+7	2%	5.0E+6	-55%	-76%	1.8E+7	62%	-14%	1.2E+7	-4%	57%
Na 330	1.6E+5	1.8E+5	1.7E+5	6%	3.6E+5	116%	4.0E+5	138%	3.8E+5	5%	2.1E+4	-87%	-94%	3.2E+5	93%	-15%	1.7E+5	-3%	88%
Ca 317	2.4E+6	3.6E+6	3.0E+6	20%	6.2E+6	109%	5.8E+6	94%	6.0E+6	3%	1.1E+6	-63%	-82%	5.0E+6	68%	-17%	3.0E+6	-3%	64%
Zn 213	8.7E+2	9.1E+2	8.9E+2	3%	1.9E+3	119%	1.9E+3	113%	1.9E+3	1%	5.0E+2	-44%	-74%	1.3E+3	43%	-34%	8.8E+2	1%	43%
Fe 239	3.4E+3	4.1E+3	3.8E+3	9%	8.4E+3	122%	8.9E+3	138%	8.6E+3	3%	9.1E+2	-76%	-89%	6.7E+3	79%	-22%	3.8E+3	-1%	76%
B 182	8.5E+2	1.1E+3	9.8E+2	13%	1.8E+3	87%	2.4E+3	147%	2.1E+3	14%	1.4E+2	-86%	-93%	2.1E+3	112%	-2%	1.1E+3	-13%	87%

* For those unfamiliar with the scientific notation:

1.0E+1 is 1.0×10^{1} which is 1 with 1 zeros or 10

3.6E+2 is 3.6×10^{2} which is 3.6 times 1 with 2 zeros or 360

7.2E+10 is 7.2×10^{10} which is 7.2 times 1 with 10 zeros or 72000000000

Figure 3.

Differences Between Bacterial Cultures and Nutrient Solution						
	Boron	Sodium	Magnesium	Calcium	Iron	Zinc
Percentage difference between culture B3 and nutrient solution	-86%	-87%	-55%	-63%	-76%	-44%
Percentage difference between culture B4 and nutrient solution	112%	93%	62%	68%	79%	43%