

## Information Loss in Fluid-Preserved Mouse

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*Abstract - This paper is not abstract at all, it is most concrete.*

### Introduction

Biological specimens that need to be preserved as a whole or in their original 3-dimensional shape are often stored in a fluid. Best known examples of such fluids are alcohol and formaldehyde which both have properties that prevent rot and mould growth. After proper fixation, tissue samples, organs and even entire animals have been preserved for centuries. These specimens contain an unknown amount of biological information of which increasingly more becomes available as analytical technology develops. DNA, proteins and other message mechanisms can be studied, and comparisons can be made between recent and ancient specimens. Until the last decade it was generally assumed that all information remained within the specimen and no one has given much attention to the loss of such information through leaching out and dissolution into the preservative fluid. Of course discolourations were noticed, as well as the formation of debris on the bottom of the jar and formation of fat globules on the fluid surface. Only recently Von Endt (1994) analysed organic materials that were leached from specimens into the preservative. Nevertheless, it is not yet clear how the process of information loss takes place, which information is lost in particular and how much.

This paper describes the attempt to throw some more light on the loss of information in fluid-preserved specimens. Research focuses on the leaching of polyletters from a mouse (*Nec computus*) preserved in alcohol.

### Methods and Materials

To investigate the transfer of polyletters from the specimen to the preservation fluid a 5-year old dysfunctional mouse (*Nec computus*) was plunged into



*Figure 1. Fluid preserved mouse (*Nec computus*) in 70% ethanol.*

a 1 L glass jar filled with 70% ethanol (Figure 1). During a year colouration of the fluid was measured each month by comparison with standard solutions of 0.001-1.0 M Mellow Yellow. Sediment was dried and studied under the microscope at 1000x magnification. Each month fluid samples were taken for HPLC analysis and gel electrophoresis. HPLC samples were completely hydrolysed into monoletters and injected onto a Alphabet separation column (ABC Inc, Abcoude). Gel electrophoresis was performed on a slab of styling gel (L'Oreal, extra strong) at 220 V

which enables separation of dissolved mono- di- and triletters. Fluid samples were treated with hyphenzymes which cleave specific letter combinations. The cleavage products are separated by letter value. Low value monoletters migrate with the front while di- and triletters experience dyslexic hinderance and migrate slower. After staining, components are identified by comparison with a marker solution.

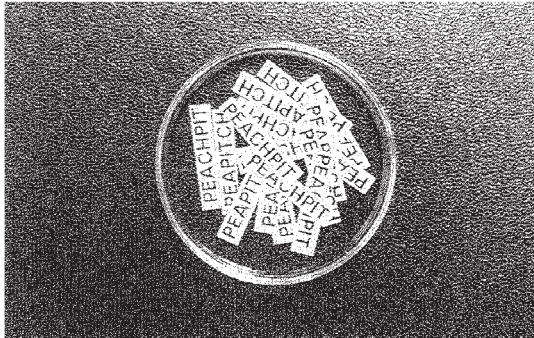


Figure 2. Microscope photo of sediment in jar at 1000x magnification.

## Results and Discussion

### Colour change

After 4 months the fluid showed a change in colour. Assuming that the ruler was straight, yellowness increased linearly with time.

### Sediment analysis

Sediment was formed after 6 months. Figure 2 shows a microscope photo of the sediment at 1000x magnification. The insoluble polyletters PEACHPIT and PITCHPEAT were identified.

### HPLC analysis

Figure 3 shows a typical alphabetagram of the fluid after 12 months (relative amounts are given in brackets). Earlier samples were similar except for the amount of P which first occurs after 4 months and, thereafter, increases with time. Given that P is yellow and both P and yellowness increase with time, it is most probable that yellowing is caused by P, an effect known as "peeing". Once there is enough P in the fluid, combination with the other dissolved letters results in the formation of the insoluble polyletters which are seen under the microscope.

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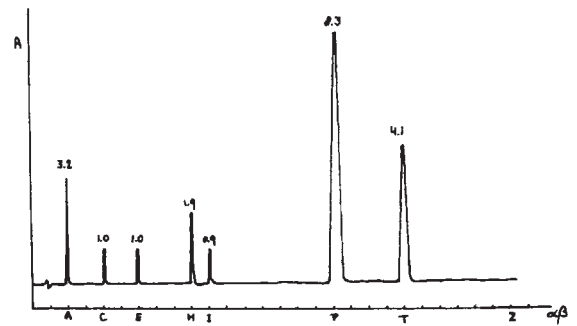


Figure 3. Alphabetagram of fluid after 12 months and complete hydrolysis of polyletters (relative amounts in brackets).

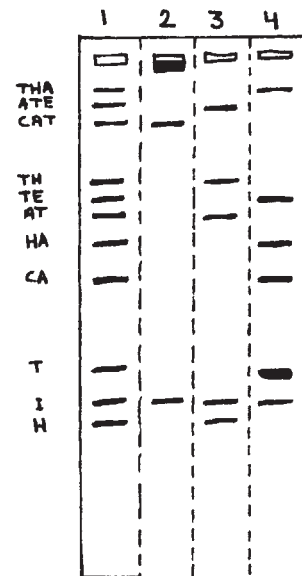


Figure 4. Slab of styling gel after electrophoresis and staining, 1=marker; 2=uncut fluid sample; 3=fluid sample cut with H/A-hyphenzyme; 4=fluid sample cut with A/T-hyphenzyme.

### Gel electrophoresis

Figure 4 shows the gel after staining. The width and brightness of the lines are proportionally related to the amount present. The marker solution was applied in lane 1. In the uncut sample (lane 2) the monoletter "I"

and triletter "CAT" can be identified. Unknown polyletters remain at the slots. After cleavage with H/A-hyphenzyme (lane 3) the monoletter "H", dileters "TH" and "AT", and the triletter "ATE" become visible as well. The "H" must have been combined with "AT" (HAT) and/or "ATE" (HATE). However, since "H", "TH", "AT" and "ATE" are all present in equal amounts and the two dileters must have been together (THAT) the "H" and "ATE" must have been together. Combination of TH with ATE would have given the insoluble THATE which was not found in the sediment. Cleavage with A/T-hyphenzyme (lane 4) gives double amounts single "T", the dileters "TE", "HA" and "CA" and the triletter "THA". Half the amount of "T" originates from "CAT" which corresponds with the presence of "CA". "THA" must have been combined with the other half of "T" which is in agreement with the presence of "THAT" in lane 3. "HA" and "TE" correspond with the presence of "T" and "ATE" in lane 3 and confirm the presence of HATE.

### Conclusion

It can be concluded that the fluid contains the mono-, tri- and polyletters "I", "CAT", "THAT" and "HATE". These are the components of the fear message "I-HATE-THAT-CAT" which was first decoded in the 1950's during experiments with house mice (*Mus musculus*) which became highly stressed when confronted with cats (*Felix annoyous*) (Stonebag, 1953). It is noteworthy that *Nec computus*, which does not usually come into contact with cats, knows and even excretes this message in times of extreme stress. It proves that *Nec computus*, although a different genus, is indeed related to the *Mus* and that the name "mouse" is justified. It is of concern, however, that this important information dissolves in the fluid. It means that the information could be lost when fluid from wet specimens is discarded and replaced by fresh preservative during restoration. If only the tissue of the mouse had been studied, one would never know that computer mice are afraid of cats too.

### Acknowledgments

The author would like to thank Michael Brother for supplying styling gel which he did not need (nothing to smear it into), and Henry Cologne and Ray Shrub for inspiring thoughts and discussion.

### References

- Stonebag, J. (1953) "*Of mice and cats*"; Ice bird Press, Antarctica.
- Von Endt, D.W. (1994) "Spirit collections: a preliminary analysis of some organic materials found in the storage fluids of mammals"; *Collection Forum*, 10(1):10-19.

### About the Author

While everything around her changes, Anna Brokowski (M.Bull) remains the same and in Emsterdem. After a strict chocolate diet she has lost many kilos and other personal belongings and picked up alcohol again. Her biggest enigma right now is where the alcohol of her collection fluid-preserved mice has gone. She cannot remember a bloody thing.