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Title: Histological Effects of fixation and long-term preservation. Are preservatives beneficial or not?

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which are still perfect. Many conference posters, papers and talks have centred around using computer printer-generated labels and since the days of 'alphabet soup' in the bottom of jars, and other such disasters, there have been developments and improvements in this field. I still handwrite my labels in Indian Ink until these newer techniques have proved their test of time.

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Histological Effects of fixation and long-term preservation. Are preservatives beneficial or not?

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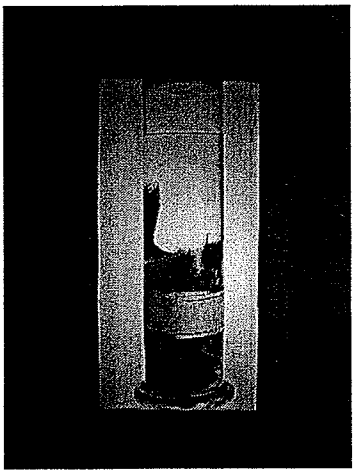
Having gained a better understanding about the workings of fixatives on tissues, we are faced with the dilemma of using preservatives. Some tissues will start to deteriorate over the long term if stored in preservative - can lead to swelling, fragility or loss of fixative state due to poor penetration if specimen is densely muscled; or if stored permanently in fixative. This is particularly exacerbated if the chemical nature of the storage solu-

tion starts to alter over time. This can be caused by:

- Neglect - too many jars to be maintained and inspected by too low staffing levels.
- Temperature – causing evaporation that can lead to dilution and through chemical change (both of these are especially relevant to alcohol which 'self dilutes' and can break down into CO2 and water!).
- Humidity levels – which can lead to growth of moulds both on and inside the jar even if the alcohol is diluted only to about 35%!
- Lipid leaching – always a problem with vertebrates, especially cetaceans and other mammals. Formalin only preserves lipids and alcohols dissolve them so that lipids can leach out into fixative/preservative solutions and contaminate them.

Examples were shown concerning this latter problem, illustrating stained lipids *in situ* in a stained frozen section of rat liver and the lipocytes emptied through solution of the lipid content after rinsing in alcohol. A pickled stoat was also shown immersed in a murky brown solution of contaminated alcohol with a pH reading of about 3 (due to oxidation of the lipids to fatty acids) and how, upon cleaning and two fluid changes, the specimen's skeleton had become decalcified by the acidic solution so that it lay on the bottom of the jar in a crumpled heap.



Faced with these problems we looked at how tissues were affected histologically at a microscopic level using samples of rat liver sections and stained with Haematoxylin (blue nuclei) and Eosin (pink cytoplasm and connective tissue). Several slides were examined showing how this balance was achieved and how, over one or two years, this balance of staining, as well as the preservation of the tissue, compared with those which had undergone osmotic shock (direct fixation in alcohol) or where the balance of staining had deteriorated over a year or two (nuclei becoming stained with Eosin pink), showed a marked deterioration in the preserva-

tion of the gross tissue.

In conclusion, Steedman's fixative and 10% formalin were found to give the best fixation results and that Steedman's PFP gave the best result providing that the tissue had been well fixed.

In conclusion, I still believe that preservatives should not be ignored. Many gross tissues benefit from them, however, be aware of a possible increase in swelling and over-fragility which, regrettably will require tissues to be replaced into fixative solutions. A question, as always, of time, shrinking budgets and staffing levels!

All of this may lead you to support the infamous controversy started by a certain deputy director at the Natural History Museum who circulated the idea that fluid collections were too expensive and troublesome to maintain so why not database all the required facts about these specimens and then bin the lot! (N.B. The author does NOT agree with this!)