

Formalin-Free Histological Fixation And Its Impact On Organs, Cells, Proteins And Nucleic Acids - A Systematic Literature Review

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Inês Lino¹, Joana Carneiro¹, Sara Viegas¹, Amadeu Borges-Ferro¹

1. Escola Superior de Tecnologia da Saúde de Lisboa, Instituto Politécnico de Lisboa, Lisboa, Portugal.

To preserve biological tissues and their components against natural degradation, a Fixation step must be used providing it with the necessary robustness to withstand further processing. 10% Neutral Buffered Formalin (NBF) is the most widely used fixative, however, this is highly toxic and carcinogenic, posing a risk to the health of professionals and the environment. This review arises from the need to find a less harmful alternative to formalin that could lead to the reduction/elimination of exposure to this reagent. To research the possibility of eliminating the use of formalin, this review aims to compare the results obtained using formalin with alternative formalin-free compounds in biological targets (e.g., organs, cells, proteins, and nucleic acids). Articles were selected following the PRISMA Methodology, searching the Pubmed and Google Scholar databases using the terms: "Formalin", "Formalin Fixation", "Fixative", "Alternative Fixatives" and "Formalin Substitutes". After analysing the initial articles with eligibility criteria and quality control, a final total of 16 articles, dated from 2004 to 2017, was obtained. Next, the 16 obtained articles were read, and relevant data for the study were systematized using identification criteria collected in tables for comparative analysis. In the literature seven formalin-free fixatives (RCL2®, Glyo-Fixx®, FineFIX®, ExcellPlus®, Boonfix®, Methacarn®, and KINFix®) were identified, and their results on the biological targets under study were generally similar to the results achieved by formalin, potentially serving as less toxic alternatives.