

# **EPR spin trapping - use, and abuse, in examining redox reactions in biological systems**

Michael J. Davies

EPR Group, Heart Research Institute, Sydney, NSW 2050, Australia

EPR spectroscopy has been used to examine biological systems since the 1950's. Many of these initial studies were carried out by direct EPR measurements on frozen specimens or freeze-dried samples. More recent studies have shown that a number of these early pioneering reports on biological radicals arose from the detection of artifacts produced by the methods that were used to prepare the samples for EPR measurement. Similar problems have bedevilled the development of spin trapping of biological radicals. With the increasing sensitivity of modern spectrometers the potential for detection of artifacts and minor reaction pathways has, if anything, increased rather than decreased, and the literature has become littered with erroneous reports.

In this presentation some of the positive and negative aspects of the use of EPR spin trapping in detecting biological radicals will be discussed with particular emphasis on methods of discerning fact from fiction. It will hopefully show that EPR is the premier method of detecting radical intermediates in biological systems, but it will also point out some of the pitfalls and problems that arise when this technique is employed by the unwary without adequate controls and supporting methodology. The recent development of analytical techniques that can support EPR assignments will be discussed, as will some recent advances in the use of novel spin traps in cellular systems.