



The importance of MRI as a diagnostic tool has in recent times more or less sidelined the utility of CATSCAN and other imaging techniques. Magnetic Resonance Spectroscopy which allows for imaging combined with Metabolomics is currently a hot topic. Professor H.S. Atreya has painstakingly collated a series of articles from several groups of authors pioneering in these areas and has guest edited this issue, the last issue of 2014. He has also ensured that the articles are well in time and are palatable both to both student community and experts in the area. I congratulate Professor Atreya for the efforts and the editorial board members join me in conveying our special thanks.

“The centenary issue” is ready for release after a brief lull due to some administrative reasons. The articles have been meticulously picked from the first fifty years of publication of our journal by a special editorial team for their scientific content in the context of current day requirements. We have now finalized the articles to appear in this coffee table supplement and the readers can certainly be assured of a whiff off the old block!

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## Magnetic Resonance Spectroscopy and Imaging

NMR spectroscopy has witnessed rapid new developments in recent years with the advent of high field strength magnets and novel techniques for boosting sensitivity and resolution. In parallel, the sister technique of Magnetic Resonance Imaging (MRI) has witnessed several technological advancements in the last decade. Both NMR and MRI have been supported by recent advances in the field of nanoscience and nanotechnology, which has provided new materials for obtaining high contrast images. Nanomaterials like Gold nanoparticles, Gold nanorods and Graphene oxide are being increasingly used for developing new image enhancing agents for improved diagnostics by MRI. In addition, new computational methods for image processing has contributed significantly to the field. Owing to these developments, MRI has now become an important tool for diagnosis of various diseases and is used routinely in medical centers. NMR spectroscopy, on the other hand, has benefitted from the availability high sensitive spectrometers (upto 23.4 Tesla as of today) equipped with cryogenic probes which boosts the sensitivity by a factor of 3-3.5. This has allowed the detection of micromolar levels of metabolites bringing the area of NMR based metabolomics (which involves the profiling of small molecule compounds and mapping their variations to cellular or systemic changes) into forefront. Metabolic profiling is now widely used for prognosis of many diseases including Cancer and Diabetes. Metabolomics combined with imaging, also known as Magnetic Resonance Spectroscopy, is a rapidly growing area of research today. It allows the metabolic profile to be obtained from localized areas/tissues of the body in a non-invasive manner. This not only provides a biomarker for detecting diseases at an early stage, but also helps the surgeon in locating the tumour site so as to minimize invasive surgery. In this issue the different dimensions of these developments, both in NMR and MRI, are discussed with articles contributed by experts in the field ranging from imaging to molecular spectroscopy. The first part of the review (first 6 articles) focus primarily on imaging and image processing beginning with a succinct history of the origins of MRI by Prof. Anil Kumar. This is followed by 2 articles on magnetic resonance spectroscopy which involve the metabolomics approach and ending with last 3 chapters on spectroscopy. The articles have been written keeping in mind both the graduate students and experts in the field as the readers.

I would like to thank Prof. Guru Row for consenting to bring out this special issue and Ms. Kavitha for assisting with the overall publication process.



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