

Australian Institute of Physics NSW Branch (May News)

The May meeting of the NSW branch of the AIP was held at the University of Sydney on Tuesday 26 May 2009 and featured a public talk by Professor Barry Allen. Professor Allen is the Director, Centre for Experimental Radiation Oncology at St George Cancer Care Centre where he runs the Targeted Alpha Therapy (TAT) project for developing new therapeutic agents for the treatment of melanoma, breast, prostate, pancreatic and other cancers.

Professor Allen having published research papers extensively in fields as diverse as neutron physics, stellar nucleosynthesis, in vivo body composition and targeted cancer therapy was in a position to provide a unique talk that successfully linked the creation of the elements in the early universe to cancer therapy.

His talk gave us an insight into how the creation of the elements, upon which all life forms are dependent, are due to a number of reactions. Charged particle reactions can produce elements up to iron, but we need the fast and slow neutron capture reactions to create the heavier elements.

Professor Allen early in his career studied the slow rate of nucleosynthesis of elements in stars by the sequential capture of keV neutrons up the valley of beta stability (s-process). His research group were able to validate this theory by the correlation of isotopic ^{30}keV neutron capture cross sections with solar system abundances, which showed the influence of the magic numbers across the periodic table over 5 orders of magnitude. The rapid neutron reaction process in supernovae (r process) created the neutron rich nuclides that decayed rapidly and led to the synthesis of the actinides.

Professor Allen then went on to explain how some 40 years later (today), the products of the stellar nucleosynthesis are being used to kill cancer cells. With the development of monoclonal antibodies, a small band of biomedical scientists have brought these two Nobel prize winning achievements together to create targeted alpha therapy (TAT) for cancer. In spite of many setbacks, researchers at St George Hospital have taken targeted alpha therapy for metastatic melanoma from the test tube to the bedside. Clinical trial results so far point to a very promising therapy. Things have been far from easy, however. A combination of lack of funding and just 'general disinterest or apathy' on the part of sections of the medical community, have threatened to halt the research program. Despite the setbacks, the world first trials of intralésional and systemic TAT for melanoma have gone ahead. Some 40% of end-stage melanoma patients received a benefit in the ongoing systemic trial, without any evidence of adverse events.

Professor Allen told of how a very unusual result arose from their research. TAT was thought to be only useful on micrometastatic tumours, however, solid tumours in patients also showed significant regression. The reason for this was at first unclear as targeted antibodies have not been known to rapidly penetrate a tumour mass, as required by the attached short lived radioisotope. However, it was found that the antibodies disrupted the capillaries leading to the tumour, thus indirectly attacking the tumour. This has led to a new approach to the regression of solid tumours which points to improved therapeutic efficacy for TAT.

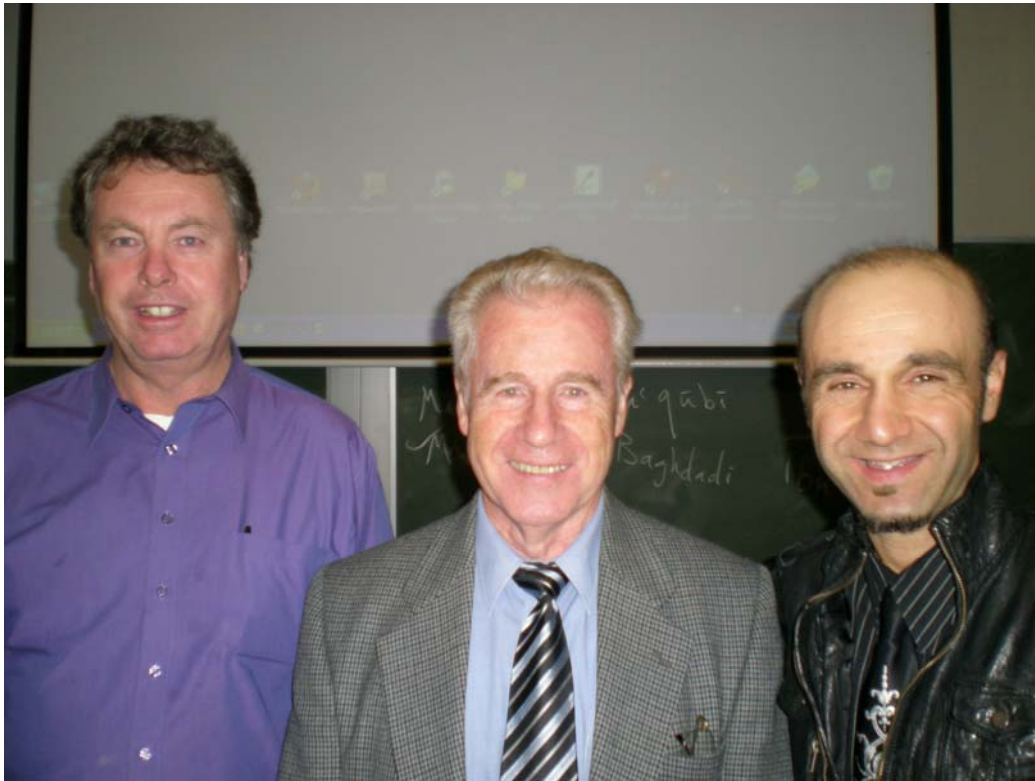


Photo: From left to right, Dr Graeme Melville (AIP Branch Secretary), Professor Barry Allen and Dr Fred Osman (AIP Branch Chair).

The combination of Professor Allen's deep inside knowledge into these areas and sense of humour, meant the talk was highly entertaining from start to finish and well received by the audience. We enjoyed further conversation into these areas and others afterwards at a nearby Italian restaurant. The Australian Institute of Physics thanks Prof Allen for an outstanding lecture!

Dr Graeme Melville – AIP NSW Branch Secretary