

## **Biopharming Media Round Table**

The Biopharming MRT took place on the 11<sup>th</sup> November 2009 at Sci-Bono Discovery Centre in Johannesburg. Biopharming is about using genetically modified (GM) plants to produce pharmaceuticals or medicines for us. This science has been around for the past 20 years but, South Africa remains in the discovery or research phase of this science with no biopharmed products currently on the market.

Michael Peter (Chief Operations Officer) from Sci-Bono welcomed the members of the media, other guests, speakers and the chair (Debra Patta) to the event. Speakers included Prof Ed Rybicki from the School of Molecular and Cell Biology at the University of Cape Town, Dr Rachel Chikwamba who is a Chief Scientist at the CSIR, Biosafety Project Officer Dr Anita Burger and the COO of PlantBio, Dr Siyabulela Ntutela.

Prof Rybicki provided an introduction and overview of biopharming and also highlighted some aspects of the biopharming research that he is involved in. Proteins like monoclonal antibodies (e.g. Hepatitis B vaccines), high-cost enzymes, diagnostic reagents, vaccines (e.g. HIV vaccines) and therapeutic proteins (e.g. insulin) can all be produced in plants. Biopharming uses the plants' natural ability to produce proteins but through genetic modification, causes the plant to produce the desired protein. Therefore drugs can be produced in plant leaves, stems, seeds and fruits. The most popular plant used in biopharming is the tobacco plant!

Prof Rybicki also explained another biopharming technique known as transient expression. A GM virus containing the desired protein infects the plant which causes the plant to produce the protein (10-14 days after infection) temporarily. The cost of production of pharmaceutical proteins using plants is 100-1000 times less than animal cell production and 10-100 times less than bacterial/yeast production. However, even though the cost is substantially less, big pharmaceutical companies have not yet jumped on the band-wagon because of their high investments in the other types of drug production mostly involving large, expensive steel bioreactors.

Dr Rachel Chikwamba informed us of the steps taken before a product is marketable. The first phase is the discovery phase or research phase, then the development phase which is followed by clinical trials and if successful, product manufacturing will take place. The University of Cape Town, CSIR, University of Pretoria and some private enterprises are involved in biopharming in South Africa. The CSIR is currently working on antibody production and the first biopharmed product in SA will be released soon. The name of this will be RabiVir, a rabies virus neutralizing antibody!

Biosafety is one of the key issues surrounding biopharmed products and methods – will it be safe for consumption, is there a chance of the GM plants contaminating other plants, etc? Dr Anita Burger stressed that products go through a very rigorous assessment and have to meet a number of specifications before they are approved and released onto the market. With respect to biopharming in SA, it seems like biopharming will take place in a contained/confined area, only non-food plants will be used, and there will be no edible proteins i.e. all proteins produced in the plants will have to be processed to make sure that the correct dosage is taken.

Finally, Dr Siyabulela Ntutela from PlantBio spoke about the Biotechnology Platforms in South Africa. He drew attention to the Farmer to Pharma Grand Challenge which focuses on combining biotechnology with the Indigenous Knowledge Systems (IKS) of SA. This means using bioprospecting to identify the plants that are traditional sources of medicine to the indigenous folk, and use biotechnology to harness these medicines making them safe and marketable. In doing so, this will add to and strengthen South Africa's bioeconomy thus putting us in a position to compete in the global bioeconomy.

It will certainly be interesting to see the course that biopharming takes over the next few years as we move from the discovery phase to biopharmed products being released onto the market. Because this has the potential to be very successful and therefore affect numerous lives, it is essential that people are informed about this science now so that when the time comes they are able to make knowledgeable decisions as to whether they are for or against biopharming.