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ASMR Medalist 2009, Professor Josef Penninger

"From fat flies and little mice to human medicine – adventures of a scientist"

A man with an almost unique view of science as an heroic, spiritual, cultural and adventurous endeavour, Josef Penninger has achieved enormous success and been given unparalleled freedom in the establishment and running of the flourishing Institute for Molecular Biotechnology of the Austrian Academy of Sciences (IMBA).

In his address to the National Press Club today, Austria's foremost health and medical research scientist, spoke of genetics, stem cells and the infinite possibilities of modern science. "Genetic research and biotechnology have entirely revolutionised our world and will be the key driving force of wealth and industries in the coming centuries."

Penninger's own research group was the first to show that the ACE2 gene controls heart function and blood pressure, and is a receptor for the virus which causes the infectious lung disease SARS (severe acute respiratory syndrome). SARS can be lethal, but understanding how ACE2 protects lungs from acute injury has opened up new avenues for the development of effective drug treatments for SARS and other similar lung diseases such as bird flu and the Spanish flu.

The journey first began when Penninger's team were investigating the genes involved in heart development in flies. They discovered that ACE2 was essential for fly heart development and decided to explore whether ACE2 possessed a similar fundamental role in mice. They created mice that were missing ACE2 and showed that these animals developed hypertension and cardiovascular disease. The next leap was to take their research from mice to humans.

"Bone loss affects millions of people and is a huge problem for the health care system and patients with osteoporosis, patients with cancer metastases into bones, or children with leukemia. For instance, the estimate is that every year one million people develop metastases to the bones, in particular women with breast cancer," says Penninger.

His team was the first to prove that a gene called RANKL is the key osteoporosis gene regulating bone loss in arthritis as well as tooth loss and explained why females are more likely than males to suffer from bone loss. This work also showed that RANKL might control bone metastases in cancer. Work into the development of a new drug to potentially block bone loss in millions of patients has progressed to human clinical trials.

"It's an amazing feeling to get the butterflies in my stomach which intuitively give me the direction in which to take my research," describes Penninger. He believes that 'scientific adventure' achieves its greatest results when the work is driven by intellectual curiosity and a passion for discovery in an interdisciplinary environment, which fosters *fearless* integrity.

For a country or an institute the aim must be to provide an open "candy store" for scientists with central top-notch infrastructure, cutting edge technology and core technicians, infiltrate the 'store' with proven clever people and allow them complete freedom to lift their vision by playing in peace and jumping into the technologies available.

Public funding, Penninger believes, should invest in basic science and allow most translational research to be left to the big companies who have the money to develop the basic findings. “Throughout history, many of the most significant breakthroughs in medicine have resulted through serendipity, and serendipity has the best likelihood of occurring when basic research is being conducted. We all appreciate that public funding is limited – surely then the best use of this precious resource is to invest it into basic research and the best talents?”

Penninger believes science is always an essential and perhaps critically so in tough economic times. "It does generate desperately needed economic returns but more importantly, good health outcomes, and hope and pride for nations and people.”

News Editors/Chiefs of Staff, please note:

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WHERE: 16 National Court, Barton, Canberra.

WHO: ASMR Medallist 2009 Professor Josef Penninger

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