Interview with Gorm Danscher

The Danish pioneer of gold implantation, Professor Gorm Danscher, was interviewed by Judie Cross on 30 November 2016. The interview was published by Laureano Ralón at *Figure/Ground* on 2 January 2017 (http://figureground.org/interview-with-gorm-danscher). This excerpt from the interview was compiled by the Ackermann Team:

Gorm Danscher has been Professor Emeritus of Neurobiology at Aarhus University since 2008 and CEO of Berlock ApS since 2002. He was awarded his Doctor of Veterinary Medicine (DVM) in 1967 from the Faculty of Life Sciences at the University of Copenhagen and Doctor of Medical Science (DMSc) in 1976 by the Faculty of Health Sciences at Aarhus University. He became an Associate Professor in 1967 and full Professor in 1988. […]

Who have been some of the important influences on you, in your work and career?

That the localization/function/toxicology of heavy metals in the mammalian brain became my lifelong passion arose from pure luck. I had started in a position as an Assistant Professor in the Department of Biochemistry and the significant head of the Department, Professor Schønheyder, a great scientist and human being, for some unknown reasons believed in me – and tried to make vitamin E my destiny in science. However, […] I made a shift and became Assistant Professor in Neuroanatomy. The professor there, Theodor W. Blackstad, was also a famous scientist in his field, the hippocampus. […] A guest scientist from Oslo, Professor Fin-Mogens Haug, was 'forced' to train me in his field, 'zinc in CNS'. […] he was the true igniter of the flame in my scientific life.

My interest in metallic gold was inspired by looking at a TV program. In that program it was shown that placing small pieces of gold in acupuncture points released pain and reduced swelling of rheumatic joints. They called it 'permanent acupuncture'. Knowing that little science supported the acupuncture technique, despite the impressive results the approach seems to have had, I came up with the idea that the effect (if not entirely based on psychological factors) could be that the gold pieces released gold ions; i.e. that it was the same phenomenon observed after systemic injections of gold compounds just played out locally; i.e. around the gold piece.

Can you walk us through the technical processes behind the possibilities gold dust offers?

A few years before I published the Gold AMG Technique, a Canadian scientist, Professor Faulk, had developed a technique that made it possible to visualise the location of antibodies bound to antigens at ultrastructural level. What he did was to replace the fluorescent molecules used in light microscopy with 40 nm gold particles. In this way the antibody-antigen connection could be traced by an electron microscope. The only problem was the technique made it impossible to view the particles at light-optical magnifications and it therefore was difficult to choose the right places to study using the electron-microscope. The gold AMG method solved this problem by encapsulating the gold particles in silver whereby they grew to sizes that could be observed both by light-optical microscopes and electro-microscopes; i.e. it became easy to study the exact localization of the same molecules (antibodies/enzymes) in tissues at all magnification levels.

The TV program prompted me to get hold of a number of the gold pieces used by physicians and veterinarians to perform 'permanent acupuncture' and placed these in several different places (including the brain) in animals designated for experimental purposes. Several weeks later, I subjected these animals to euthanasia, took out tissue samples that contained the gold pieces, embedded the tissue in plastic, AMG enhanced, and looked for a possible release of gold ions from the gold pieces.

Before this study it was firmly believed that metallic gold was inert; i.e. it could not be dissolved in an organism. Gilding of implants, stents and the like was, and still is, widely used in surgery. But the above studies showed that metallic gold is slowly dissolved when placed in a living organism.

At ultrastructural levels I could see that the gold pieces were attacked by macrophages that started to release gold ions from the surface of the gold implants. The bio-released gold ions diffused out from the surface and were taken up by the macrophages themselves and, in particular, mastcells – these cells are mainly responsible for the oedema/swelling that is so characteristic of rheumatic joints. As a rough simplification, one could say that because macrophages are key cells in the inflammatory cascade and mastcells central for swelling; pollution with the bio-released gold ions orchestrate the observed suppression of the local inflammation, remove the swelling and clear away the pain in animals and patients.

I also proved the obvious, that the bigger the surface; i.e. the more gold surfaces accessible to macrophages, the greater the release of gold ions. The two products BI and BMI are developed keeping this in mind.

You began your own company in 2002. I'm curious about the motivations behind your decision to combine business with academic life. Also I wonder whether such a change was in any way related to challenges facing university environments today?

My scientific life has revolved around 'biological effects of heavy metals, in particular the vital importance of the metal, zinc (Zn). […]

In order to finance these studies, I had to broaden my activities to exploring toxic metals like mercury, bismuth, lead and silver. […] In 1981 I developed the 'Gold-Autometallography' (Au-AMG) mentioned above. It was based on the discovery that UV light can transform chemically bound gold ions to metallic gold nanoparticles.

For many years, rheumatism has been treated with a gold compound called [sodium] aurothiomalate (Myocrisin®). The drug is injected in a muscle and the gold ions (Au+++) are distributed to all parts of the body, apart from the brain. The treatment is known to be beneficial for about 60 per cent of patients; i.e. it reduces swelling and pain in the joints, but is very toxic. Therefore, new anti-rheumatic drugs have been developed, but when they don't help, Myocrisin is still used at some hospitals. Our research has shown that metallic gold, on the other hand, is safe – supporting the notion that although used for thousands upon thousands of years in the Far East and India no harm has been associated with its use. Only when used as a gold compound, i.e. Myocrisin, is it dangerous and has to be used with great medical care. In a multitude of papers, we have supported this 'safe' notion.

In 2002, I started a little company, Berlock ApS, based on financial support from the Danish export promotion agency and after having obtained permission from Aarhus University to exploit this discovery. Today, Berlock ApS has patents in Europe, USA, China and Canada and produces two gold products for treating sterile inflammation, BerlockImplants(BI) and BerlockMicroImplants (BMI). Research on animals is accumulating and applications for further research on animals and patients have been sent to the NIH and private funds here and abroad. The products have not yet been approved by FDA in USA or the Health Authorities in Europe.

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Whole interview: Judie Cross: "Interview with Gorm Danscher", *Figure/Ground*, November 2016. http://figureground.org/fg/interview-with-gorm-danscher**.**