

Media communiqué

St. Gall / Duebendorf / Thun, 14th December 2006

Empa-Medtech development transferred to industrial partner

Cooling pants improve MS patients' quality of life

Multiple sclerosis is an incurable nervous disease which causes paralysis in many sufferers. However thanks to early diagnosis and modern medical treatment and support many MS patients are still able to lead a practically normal life. Recently Empa material scientists developed ultra thin cooling pants which are both pain relieving and afford patients greater mobility. The patent covering the device has just been transferred to an innovative Swiss SME, Unico swiss tex GmbH. Project Leader Dr. Markus Rothmaier was also very pleased to receive a cheque for over CHF 25,000 from the Serono Charity Grant 2006 which will fund the further development of the cooling garments.

The discovery of the soothing effect of cooling was made by pure chance by a doctor who was also an MS sufferer. Surprised by a sudden heavy shower of rain, she noticed that with the cold, wet clothing she could walk further before she became tired. The reason was that as her clothing dried the heat of evaporation caused her body to cool, thereby increasing the speed with which impulses from the brain were transmitted by her nerve cells. The pain in her limbs reduced and her arms and legs became more mobile.

High-tech materials with cooling effects

Would it be possible to create the same affect without the need for a cloudburst? Could the evaporative cooling effect be reproduced using modern, high-tech materials? Cooling systems which are worn on the body are already used in space suits and for military applications, but these turn out to be of little use in an everyday setting – they are far too bulky. MS patients would not be able to move around in public with such devices.

In developing a practical, wearable solution to this problem, Markus Weder's team from Empa's «Protection and Physiology» laboratory turned to composite membranes which are already in widespread use in the clothing industry and which, though waterproof, can simultaneously "breathe". However, instead of using a single layer, the scientists took a double layer of polyester laminate, just five to ten microns thick, and tailored a pair of trousers out of the material. The hollow space between the two layers was filled with 10 millilitres of water, and as it slowly evaporated from the outer surface of the garment it created a pleasant cooling effect on the inner side. In this way it was possible to cool the surface of the skin of the person wearing the pants by up to 4°C for as long as forty minutes.

«Our cooling pants are not a cure», says Markus Rothmaier, the current leader of the project, which is financially supported by the Swiss Multiple Sclerosis Society. "With this device we are simply improving the patient's quality of life a little. The garments are not an alternative to drug therapy or other treatment; they are merely an aid, for example during physiotherapy."

From development to production

The idea of the cooling pants won over an innovative Swiss SME. Unico swiss tex GmbH, based in Alpnachstad, Canton Obwalden, recently bought from Empa the rights to produce cooling garments – so called Cool Pads – for MS sufferers, among other users. These products will become available in 2007. Very recently too, a joint study under Empa leadership has begun at the Rehabilitation Clinic in Valens to investigate the suitability of the cooling pants for everyday usage and their effectiveness.

«We are working continuously with Markus Hess of Unico swiss tex GmbH to further improve the system», says Rothmaier. One aspect of this is the search for materials with improved stretching properties which are easier to tailor. In addition plans are afoot to design cooling garments for other parts of the body, for the greater the cooled body area and the nearer it is to the wearer's head, then the greater the evaporative cooling effect. Whether, in addition to the extremities, cooling the torso could also have beneficial effects in reducing MS symptoms is not yet certain and must first be clarified with elaborate tests. Rothmaier's team is preparing designs for suitable cooling garments for this purpose, to be presented in a few months.

Honored with the Serono Charity Grant 2006

The simple but extremely effective Empa idea was awarded the Serono Charity Grant 2006 at the beginning of September. Serono, a biotech company based in Geneva, is a pioneer in the fight against multiple sclerosis, offering an established therapeutic product to treat this progressive disease. The Serono Golf Charity, held for the third time in Ascona, collected over CHF150,000 of which the goodly sum of CHF25,000 was awarded to the Empa cooling garments project.

What is MS?

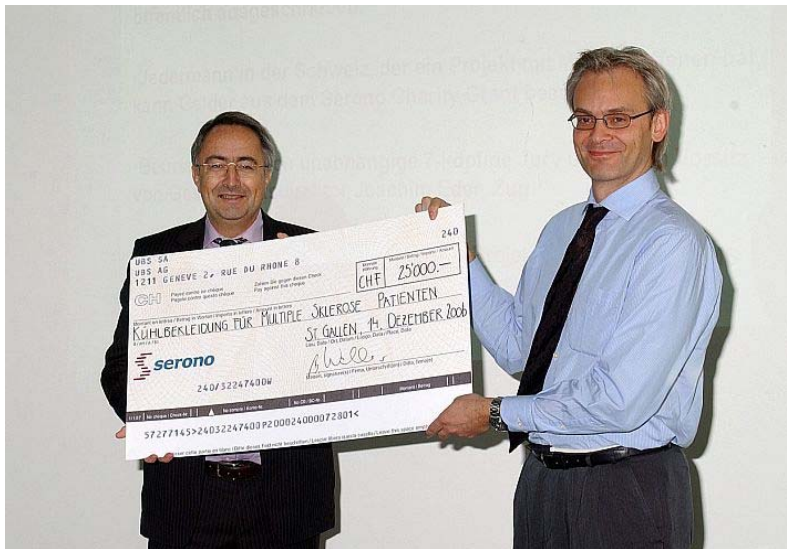
Multiple sclerosis (MS) is a disease of the central nervous system. After epilepsy, MS is the second most common neurological condition affecting young adults. MS is a so-called auto-immune disease, meaning that the body's own defence cells attack healthy tissue – in this case the nervous system. This may result in inflammation of the brain and spinal cord, as a result of which the nerve cell "insulation", the myelin layer, is destroyed. The conductivity of the nerves is then reduced, leading to the typical symptoms associated with MS. Patients may suffer prickling sensations, spasms, paralysis and visual problems, and become easily exhausted. To date no cure has been found for MS, although medication is available which reins in the overactive immune system, reduces the symptoms and slows down the progress of the disease. An early diagnosis in combination with frequent, high-level dosage of the appropriate medication allows many patients to follow a practically normal lifestyle.

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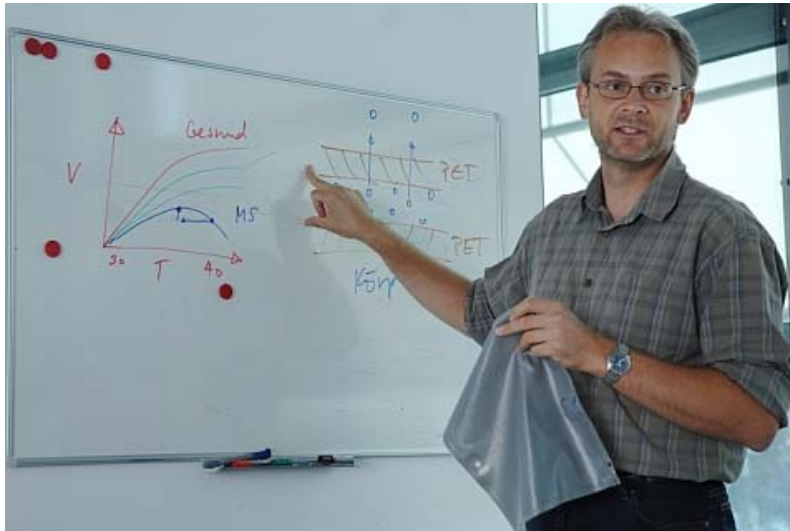
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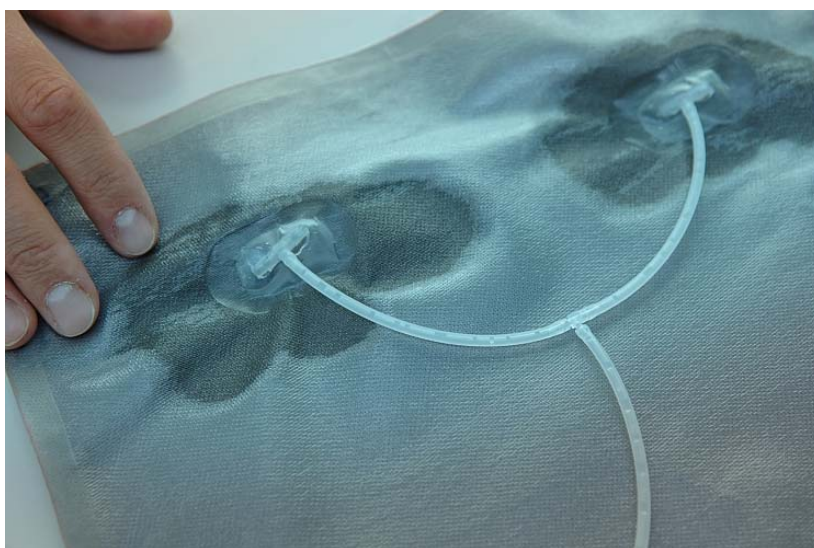
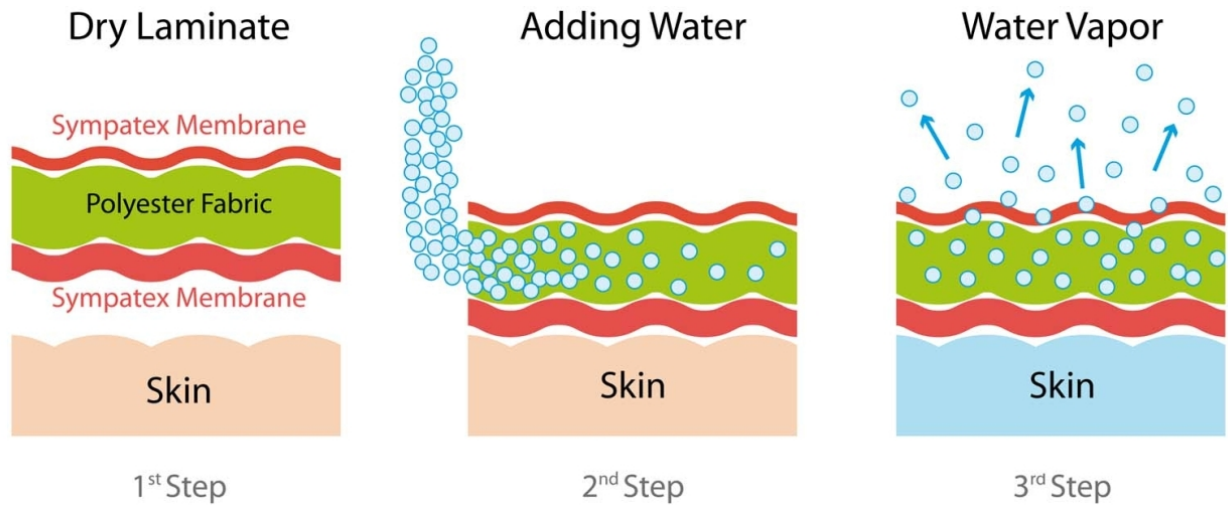
Bruno Waller (Serono Pharma Switzerland) hands Empa's Markus Rothmaier a cheque funding the further development of cooling garments.



Markus Rothmaier explaining that for the greatest effect the largest possible bodily surface area must be covered.



Markus Rothmaier describing the theory of how the cooling parts work.



The cooling pants (here a prototype version) are filled with 10ml of water. They are capable of cooling the skin by up to 4°C for forty minutes.

Images can be ordered from martina.peter@empa.ch