



**Diabetes Singapore recently caught up with Dr Gordon Ku, a visionary and go-getter who wears many hats. A nephrologist in private practice, the amiable chairman of the Kidney Dialysis Foundation and co-founder of AWAK Technologies talks about his company's latest invention, the wearable dialysis device, and what dialysis patients can gain from using it.**

**1. Can you tell us about the technology behind the new wearable dialysis device (known as AWAK) which you have been working on?**

AWAK, which stands for "Automated Wearable Artificial Kidney", is the world's first wearable peritoneal dialysis (PD)-based device ever to be developed. Weighing only 1kg, patients using AWAK can have continuous dialysis treatment anytime, anywhere.

AWAK employs a sorbent-based regeneration technology which recycles peritoneal dialysis

fluid, through a process of toxin removal and electrolytes enrichment. The flow of dialysis fluid is in a continuous tidal fashion. The device consists of two parts; firstly, the cyclor, which contains the non-disposables inclusive of power supply, small dialysate pump, and a computer module. Secondly, the absorption of uraemic toxins takes place inside the disposable sorbent cartridge, which also includes the enrichment module.

**2. How and why did you come out with this idea of AWAK?**

The vision of AWAK is to create a new paradigm in renal dialysis, as there has not been any major advancements in this field over the last fifty years. AWAK's mission is to contribute to the welfare of patients, society, technology and economy.

The theory and concept behind AWAK was postulated by Professors David Lee and Martin Roberts, University of California, Los Angeles (UCLA) in 1999. I recognised the potential of this invention in fulfilling both the vision and mission I mentioned earlier. In April 2007, AWAK Technologies was incorporated in Singapore to develop the theory into reality. Exclusive licensing for the patent was secured from UCLA and Temasek Polytechnic was invited to participate and develop the device.

**3. In what ways is this device superior to existing methods of dialysis (Haemodialysis and PD)?**

The major limitations of current dialysis is the lack of freedom due to the dialysis regimens, relatively high cost and recurring infections. AWAK is more efficient than all the existing forms of kidney dialysis. It affords 24 hours of continuous treatment, thus avoiding the wide fluctuations in body chemistry, and mimicking closely the excretory function of the kidneys. The control of hypertension, anaemia, phosphate retention – problems common in renal failure patients – will be superior as well. Its wearability or portability will improve the quality of life of patients. The time saved from not having to attend regular treatment at haemodialysis centres will contribute to more working, leisure, and holiday



travel time. Time is the most valuable commodity in life and it is a commodity that cannot be bought.

**4. How easy would it be to use this device and are there any disposable parts?**

AWAK is made to be simple, with only three buttons for the patients to operate. The disposable cartridge has to be changed two to three times daily via a slide-in and lock mechanism, with no handling of any sterile parts, thus reducing risk of infection.

**5. How soon can we expect AWAK to be available in the market? Has the device reached the regulatory stage?**

AWAK is expected to be commercialised in 2012. Multi-centre trials will be conducted shortly in Europe, the US and Singapore, leading to CE and FDA certifications.

**6. Cost has been and is still a major issue for dialysis patients. Will this device be more cost-effective for existing dialysis patients?**

AWAK is expected to be priced similar to the current dialysis cost of each country. However, it will be more cost-effective as the use of medications for hypertension, anaemia and phosphate retention and the associated costs are expected to go down. For the dialysis provider, infra-structure, equipment and manpower costs will also be substantially less. This economic benefit will be reflected at the national and international levels. It augurs well for national healthcare planning and budgeting, especially at a time when the number of dialysis patients in all countries is rising steadily.

**7. Finally, what can we expect of AWAK in the future?**

Apart from its impact on the individual, the economy and the bio-medical industry in Singapore, AWAK will be a viable alternative to renal transplantation. As we explore AWAK's possibilities and application beyond renal medicine, the ultimate aim of all the team members at AWAK Technologies will always be to contribute to humanity.

