“The basic sciences are extremely interesting and filled with boundless research questions. However, having a clinical background offers us a different perspective into the translational aspects of this research. With respect to our novel findings on the protective role of hydrogen sulphide in organ preservation, I knew that clinical research into organ preservation was an area that was lacking, so I applied knowledge that others had gained in studying biochemical pathways and zoological research and took it one step further. Sometimes seeing things from a different light allows one to bring everything together,” explains Dr. Alp Sener about his research on prolonging renal graft survival, for which he recently received both the 2013 Vanguard Award from the American Society of Transplant Surgeons as well as the Canadian Society of Transplantation Research Excellence Award.

After graduating from the University of Texas at Austin with an undergraduate degree in Biology, he received a Ph.D. in Cardiovascular and Renal Physiology from the University of Calgary where he studied the effects of small molecules, like nitric oxide, on developmental physiology. He then decided to pursue an M.D. rather than completing a post-doctorate fellowship. However, he kept his passion for research alive through transplant-related and uro-oncological research during his residency in Urology at Western University. After his residency, Dr. Sener completed a fellowship in kidney and pancreas transplantation at the University of Maryland, followed by a post-doctoral fellowship in transplant immunology.

After he completed his fellowships, Dr. Sener successfully received the Schulich Clinician Scientist Award, and still remains the only surgeon to receive it. In establishing his research program, he remembered reading an article from *Science* Magazine that his father had sent him a few years earlier about the protective effects of endogenously produced hydrogen sulphide (H$_2$S) on hibernating animals. Hibernating animals were found to have higher levels of H$_2$S in their bodies than non-hibernating animals. Studies then demonstrated that if H$_2$S production was inhibited in these hibernating animals, they would die, suggesting that H$_2$S offered a protective effect during periods of hypothermia and low metabolic rates. Dr. Sener reasoned that donor organs were similar to those animals in hibernation – placing the donor organ on ice and in a special preservation solution leads to a decline in its metabolic rate, so could the supplementation of the existing preservation solution with H$_2$S have a protective effect on donor organs?

“That was how we came up with the idea … we tried it, and it worked! It may not have worked, but it did,” says Dr. Sener. This new discovery that H$_2$S may work as a protective agent in donated organs may
one day have a significant clinical impact in minimizing the level of damage organs undergo when they lose their blood supply after removal from the donor. Today, using the results of the H$_2$S experiments, the Sener Lab is working on prolonging the survival time and function of kidneys during ex vivo storage and pulsatile perfusion through developing novel donor organ preservation solutions which also appear to minimize post-transplant kidney rejection.

The Sener Lab is not only working on improving the preservation solutions that donated organs are placed into, but is also working on maximizing their delivery through the use of mechanical perfusion technology. “Clinically, we are using the same preservation solutions that were developed decades ago. Scientists haven’t really tried to change or fix them because they work, but that doesn’t mean that they are perfect. Our goal is not to make a new solution, but to find either one or two additives that could be supplemented to existing solutions to improve their protective effects—it could make a huge difference in overall patient outcomes. In addition, our preliminary data suggests that the use of mechanical perfusion to deliver supplemental agents may enable us to transplant previously undesirable or damaged organs. On average most transplanted kidneys last 10-15 years, but using our additives, they could last another 2-4 years—this could have a massive positive impact on our patients. Although we have not yet tried our solutions in the clinical setting, if our animal data translates to human transplantation, it would mean that patients would not need to go back onto dialysis for another 2-4 years or that he/she wouldn’t need to be put back on the transplant list for a second or third kidney for that much longer. This would also have profound effects on the supply and demand imbalance between the shortage of suitable donor organs for transplantation and the growing waiting list of patients who need them.” Dr. Sener believes that there are a lot of new and exciting things coming up in the future of organ transplantation. “I think that the future of transplantation is bright with so many new areas of research popping up including the development of new and improved immunosuppressive agents, ongoing modifications to the use of mechanical perfusion technology which may enable the storage of donor organs at body temperature to minimize injury from the cold, the use of silencing RNA and nanotechnology to avert certain molecular pathways in the cellular response to injury, as well as tissue engineering and stem cell transplantation which may one day enable scientists and clinicians to put an end to organ shortages by growing organs specific to each patient in the laboratory prior to transplanting them. Thinking outside the box is how we are going to make these happen in the future.”

So what’s the best part of being a clinician? Dr. Sener says it’s the patients. “The impact you see in patients’ lives after treating them for even the simplest things is so satisfying,” says Dr. Sener. He loves seeing their happy faces after the treatments. Apart from common issues like kidney stones or removing obstructions from a grown prostate, Dr. Sener also performs kidney and pancreas transplant operations. “You have patients that come who have become very depressed. They go to dialysis which takes 3 to 4 hours each time, and they do this 3 times a week. It’s very difficult for them to have a job,” comments Dr. Sener. But then, after giving that patient a kidney transplant, once they are discharged home, they can lead a normal life, as long as they continue to take their immunosuppression. Dr. Sener says that “gaining 10 to 20 years without dialysis changes the patient’s life dramatically; they can go on trips, go to work, enjoy their families and are able to lead fulfilling lives.”

Of course, being a clinician can also be very tough. As a family man with two children and a wife, Dr. Sener says that you don’t always get to see your family. This is especially true in his field where the nature of
transplant operations requires unpredictable hours. Dr. Sener says that “having a very supportive and understanding family is extremely important and if that were not in place, my job would be very difficult.” Also, individual time can be hard to come by. The three jobs: a busy clinical practice, a research laboratory, and a family are a tough juggling act.

Although Dr. Sener has lived in many different cities in North America, why did he choose to pursue his career interests in London? “The environment was key. The Schulich School of Medicine & Dentistry is excellent. The training and education here produces the best medical students and residents, which is obviously something desirable since we work with them on a daily basis,” reflects Dr. Sener. Further, he cites the exceptional Urology and Microbiology and Immunology Departments as well as the deep roots and strong history of the Multiorgan Transplant Program in London as another major reason for deciding to work in London as a clinician scientist. Additionally, the infrastructure available was another important factor that has allowed Dr. Sener to set up his successful practice and research lab here in London.

Although he has a clinical practice, “research drives [his] day.” Getting involved in research early is what he recommends to undergraduate students because not only does it help keep your mind active by integrating information from various disciplines, but it also helps you with your career. “Getting into a professional or graduate school is becoming increasingly more competitive,” remarks Dr. Sener. He advocates differentiating yourself so that you stand out from the person next to you in class—research is an excellent way of accomplishing this. Dr. Sener also emphasizes that it is vital is getting a mentor. “Whether the mentor is in the field you want to get into, or in the field you’re currently in, or even if he/she is just someone you can bounce ideas off of, you always need them—regardless of what stage your career is at,” comments Dr. Sener. Obtaining guidance from a mentor is a lifelong process that helps you get through difficult times. Dr. Sener reminds students that when entering a laboratory, they should always be gaining something out of it – “experience, personal satisfaction, new research ideas – it should be a two-way street between your supervisor and yourself.”

Overall, Dr. Sener urges students to simply get involved, and to get involved early. What’s worked for Dr. Sener is “always having a contingency plan.” Whether it’s in regards to applying to medical or professional school, or simply when conducting research, a contingency plan can always help you proceed in the forward direction even if it’s through a different path you didn’t initially imagine yourself taking. “Always have an open-mind, in life and in research,” concludes Dr. Sener.

To read more on Dr. Sener’s lab and research, please visit his website at: http://publish.uwo.ca/~asener2/The_Sener_Laboratory/Welcome.html