Prof. Harald Ott: regenerative medicine is an important solution for the end-stage lung disease and end-stage organ failure

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Expert introduction

Prof. Harald Ott (*Figure 1*) is best known for his work in whole organ regeneration. He discovered and perfected the method of stripping an organ of its own cells and then infusing the remaining scaffold with new progenitor cells [Perfusion Decellularized Matrix: Using Nature's Platform for Engineering Bioartificial Heart. *Nat Med* 2008 Feb;14(2):213-21]. To date, his technology has been successfully applied to heart, liver, lung, kidney, and pancreas regeneration. This method of reseeding and engraftment with native cells potentially eliminates donor organ shortage and the need for life-long immunosuppression in transplant patients, and thus lays the path for effective solutions for the millions of people in need of organ repair or replacement. Harald's background is in surgery (M.D.; University Innsbruck in Austria, 2000) and this training has been an asset for his chosen field of scientific research. The privilege to work with patients suffering from end organ failure provides both motivation and inspiration to continue his work in organ regeneration.

Figure 1 Prof. Harald Ott from Massachusetts General Hospital.

Editor's note

The 6th Oriental Congress of Thoracic Surgery (OCTS) was successfully held in the Shanghai Exhibition Center from Sep. 19 to Sep. 21, 2019. As one of the Oriental Brand Series of Shanghai Medical Association, the congress has gathered many well-known thoracic surgeons at home and abroad, including experienced thoracic surgeons from many Chinese hospitals and members from the Society of Thoracic Surgeons (STS), European Association for Cardio-Thoracic Surgery (EACTS) and European Society of Thoracic Surgeons (ESTS). Focusing on the latest advancement in thoracic surgery and research, the congress has provided a significant chance for speakers and audiences for sharing and discussion, with wish for benefiting the patients.

During the congress, Prof. Harald Ott from the Massachusetts General Hospital and member of the STS, has presented an interesting topic about "Bioengineering approaches to tracheal replacements and end-stage lung disease", earning great applause from the audience. Taking this opportunity, the editorial office of *Shanghai Chest* is honored to invite Prof. Ott for an interview, sharing his research in the regenerative medicine and passion as a surgeon united physician-scientist.

Understanding the situation that there's a huge gap between donor organs, transplant organs that are available for transplantation and the patients who need them [about 5,000 transplantation done per year globally while if look at chronic obstructive pulmonary disease (COPD) alone, about 3.2 million patients died from end-stage lung disease related to emphysema per year], as well as that "end-stage lung disease and end-stage organ failure in general are going to be the leading healthcare challenges in the next 30 years", Prof. Ott believes the regenerative medicine will be one of the important solutions. The regeneration or bioengineering of lung graft will try, or at least try to solve the problem by providing graft that can be grown on demand and then used to replace a failing lung and patients

Figure 2 Interview with Prof. Harald Ott: regenerative medicine is an important solution for the end-stage lung disease and end-stage organ failure (1).
Available online: http://www.asvide.com/watch/32999

suffering from end-stage lung disease.

With multiple technologies in regenerative medicine are in evolution, Prof. Ott thinks it's important for surgeons be involved in the development of these therapies because surgeons are going to be the ones who actually apply the therapy and replace lost tissue function by implanting living graft.

Speaking of the development of bioengineering in the next 5 to 10 years concerning its application in thoracic disease, Prof. Ott thinks that the focus will be to increase the maturity of the tissue as bioengineering is still at an early stage where the grafts or the tissue are not mature enough to be ready for transplantation. For these therapies to be clinically relevant, various functions still need to be improved.

Regarding the role as a surgeon united physician-scientist, Prof. Ott shares that it gives him the very unique connection to the patient as well as the very unique connection to the clinical application of the science. Everything they do is driven by the clinical need. At the same time, they understand the modality, or the needs of clinical devices as they work with patients and do surgery on patients, so they understand what those graft actually have to look like, what the properties have to be like in order to be clinically valid.

Meanwhile, it's also the clinical need that Prof. Ott recognizes every day from work that motivate him to be a surgeon united physician-scientist—"when come to work, we try to help people and we realize that for some diseases, there's no therapy yet. And so the only way to solve that problem is to try to come up with your therapist yourself, and that's what I try to do".

At the end of the interview, Prof. Ott also tells what keeps his passion in the field! For more details, please click the video (*Figure 2*).

Interview questions

(I) Today you've shared the topic about Bioengineering approaches to tracheal replacements and end-stage lung disease. Here would you share some take-home message?
(II) What do you think is the key for surgeons to apply the bioengineering for end-stage lung disease?
(III) We know that you're known for the work in the whole organ regeneration and this technology has been successfully applied to many organs. Based on your experience, what's the principle for the application of this technology in thoracic disease?
(IV) Where do you see the Bioengineering is going in the next 5 to 10 years concerning its application in thoracic disease?
(V) How do you think the experience as a surgeon is helpful for your scientific research?
(VI) What encourage you to make the adjustment and choose to focus on the scientific research?
(VII) What keeps your passion in the field?

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1. Gao S. Interview with Prof. Harald Ott: regenerative medicine is an important solution for the end-stage lung disease and end-stage organ failure. Asvide 2019;6:314. Available online: http://www.asvide.com/watch/32999

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