



Prof. Mickey Boon Chai Koh: CAR-T cell therapy is efficient and powerful, but also risky

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Expert's introduction

Prof. Koh is a Consultant Haematologist and Senior Lecturer at St. George's Hospital and Medical School, London, UK. He is also the Programme Director of the Stem Cell Transplant Programme as well as being the Clinical Lead for Bone Marrow Failures and Rare Haematological Diseases at St. George's Hospital. Moreover, he is the Programme Director of the Cell Therapy Facility in Singapore which is housed in the National Blood Bank, too.

Besides devoting to direct patient care, Prof. Koh has dedicated himself to the harmonization and regulation work of cellular therapy. He is currently involved in the worldwide harmonization of transplant and cell therapy practices as well as the regulatory frameworks and terminology for cellular therapy. On the other hand, he sits on the board of various transplant and cell therapy organizations including being the Chairperson of the Cell Therapy Working Party at International Society Blood Transfusion and Chairperson of the Graft Processing/Cellular Therapies subcommittee of Worldwide Network for Blood and Marrow Transplantation. He is a board member of the International Society of Cellular Therapy and an expert panel for the mesenchymal stromal cells working group.

Last but not least, he is also an advisor to the World Health Organization on matters of transfusion and cellular therapy and addressed the WHO recently on the current international landscape for cellular therapy.

Editor's note

On December 16th and 17th, 2017, the "2017 Taiwan Society for Therapeutic Radiology and Oncology Conference: 'Bring Insight into Impacts' and Both Sides across the Strait Forum" was held at Taipei Medical University, Taiwan. The discussed topics in the conference

were mainly related to precision medicine, proton therapy, cellular therapy, and even a report on the advanced knowledge of nasopharyngeal carcinoma and head and neck cancers. One of the speech topics was talking about cellular therapy, which has been discussed frequently in the field of medicine because it has opened up new prospects. Cellular therapy has been a focus in recent years since it provides another way for doctors to treat cancer, and could even bring better results to patients.

Prof. Mickey Boon Chai Koh (*Figure 1*), a consultant hematologist serving at St. George's Hospital as well as in Singapore, was a keynote speech speaker on December 16th in the conference. The topic of his speech was "Cell-based therapy and its applications in radiation oncology". In the speech, Prof. Koh mentioned the effectiveness of Chimeric Antigen receptor (CAR-T) cell therapy, a therapy which is very powerful yet with potentially severe side effects. Undoubtedly, his speech fascinated attendees since CAR-T cell therapy has revolutionized the cancer treatment.

AME Taipei Group had the honor to have an interview with Prof. Koh on December 16th to let Prof. Koh share the reason why he chose to devote to hematology, how CAR-T cell therapy works, side effects of CAR-T cell therapy, and the importance of the regulation work for cellular therapy (*Figure 2*).

Interview questions & responses (*Figure 3*)

TRO: Why did you choose to be a hematologist?

Prof. Koh: Hematology has been attractive to me because it has a diverse portfolio. I early realized that hematology could let me take part in not only research in the laboratory but also the direct patient care. Moreover, hematology has a huge basic scientific component as well. For me, it is ideal and fascinating to combine basic science research, examining blood cells in blood films, and bone marrow biopsy and applying those observations in the clinical



Figure 1 Prof. Mickey Boon Chai Koh.

management of patients. Hematology is a combination of basic science, pathology and clinical practice. Absolutely the combination has fascinated me. On the other hand, I also like how hematology interfaces with immunology, which is one of my interests.

TRO: *In your speech, you focused on CAR-T cells. Could you tell us how CAR-T cells work to treat cancer or used in immunotherapy?*

Prof. Koh: Immunotherapy has got a quite long history but it seems to have culminated in the last couple of years with the appearance of CAR-T cell therapy. The breakthrough brought by CAR-T cell therapy has been a very exciting achievement for cellular therapy. Not only could these gene modified cells be manufactured like a “drug”, it is also extremely effective. Furthermore, CAR-T cells perhaps have a better efficacy than even some powerful drugs. In fact, the way that CAR-T cell works is to harness the power of the immune system and synthesising the combined advantages of B cells and T cells into one hybrid molecule. It demonstrates how potent an individual’s immune system can be but also how complex it is—truly a marvel of nature!

TRO: *Are there any side effects or disadvantages brought by CAR-T cell treatment?*

Prof. Koh: Unfortunately, in medicine, it has never been simple. Whenever we deal with something that’s effective, we’ve always learned that side effects accompany it. The



Figure 2 Photo with Prof. Mickey Boon Chai Koh after the interview.



Figure 3 Interview with Prof. Mickey Boon Chai Koh: Cart-T cell therapy is efficient and powerful, but also risky (1).

Available online: <http://www.asvide.com/article/view/23426>

same situation applies to CAR-T cells.

To some extent, the side effects that CAR-T cells manifest are not only surprising but also severe as well. In fact, some patients have succumbed to some of these side effects, which of course cannot be ignored because not only do we have a very efficacious therapy but also have a therapy that can be associated with significant side effects. Two main side effects which CAR-T cells do generate and I’ve

concerned are: The first one is cytokine release syndrome (CRS), which can be fatal. The second one, which is less commonly understood, is the neurological toxicity, which we have not fully elucidated the mechanisms. Thus with power and efficacy, CAR-T cell therapy has also risk.

TRO: *You work at worldwide harmonization of transplant and cell therapy practices as well as the regulatory frameworks and terminology for cellular therapy. What's the biggest challenge you have ever met?*

Prof. Koh: Cell therapy will be probably one of the most important treatments in medicine. Also, we have made good progress with understanding the biology of stem cells and moving ahead with various forms of stem-cell therapy, a part of cell therapy which is getting more and more attention. Nowadays, stem cells are being used for various degenerative diseases. As I've just said earlier, the key point is some of them could be associated with potential severe and perhaps unexpected side effects. When we use stem cells, we would worry whether some of these stem cells would turn into unwanted tumours or whether these stem cells would affect the body in ways which we did not anticipate which we do not want to happen. Most important of all, we need to make sure that these cells are manufactured, tested and used in a proper way. That is, patients could be treated safely.

Therefore, cell therapy needs to be properly regulated by governmental agencies. We need to do this not only in each country, but also do this on a worldwide basis because these days medicine and treatments are international. We need to make sure that patients going from one region to another region could have the same comfort as well as assurance by having these frameworks applied in every place. One of the exciting things but also a considerable challenge is that there is so much unfiltered information out there on the Internet. Patients could read, know and understand many exciting treatments and sometimes they think some treatments will cure everything. As a result, it is vital that we empower patients with proper knowledge so that they not only know how powerful and how attractive treatments can be, but that there are also many cautions and deliberations involved. In my opinion, those are challenges. However, to a certain degree, these are attractive challenges because if we can reach worldwide harmonization, we could have a better and safer treatment worldwide.

TRO: *Do you have any suggestions to young doctors who would like to devote to hematology?*

Prof. Koh: I always say how attractive hematology is and encourage my amateur trainees or junior doctors to devote to hematology because it offers a diverse portfolio. Being a hematologist, doctors could choose what they would like to eventually explore: such as dealing with cancers (oncology), blood clotting (hemostasis), blood transfusion immunology. There are a wide range of things which doctors could do within hematology. In addition, there are ample chances for hematologists to do research. As a consequence, I personally highly recommend young doctors to devote to hematology.

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