Academic Year 2013, D1 Medicine & Life Science Seminar. 平成 25 年度医学・生命科学セミナー

Strategies to Resolve The Organ Shortage

Date：February 19th (WED) from 17:30. 2 月 19 日（水）17:30～

Place：Lecture Room 2, Medical Education & Library Building 3F. 医学教育図書棟 3 階第 2 講議室

Lecturer：Mr. Kazuhiko Yamada

（Director, Center for Advanced Biomedical Science and Swine Research, Kagoshima University）

山田和彦先生　鹿児島大学医用ミニブタ・先端医療開発研究センター　センター長

Transplantation is the only cure for end-stage organ disease. Although improvements in operative technique and immunosuppression have increased the organ donor pool for living organ donation, there remains a vast disparity between the number of organs available for transplantation and the demand for these organs. Exceptional progress has been made in the fields of regenerative medicine and stem cell technology; however, de-novo and regenerated organs are not currently capable of sustaining life in animal models. An inexhaustible supply of donor organs would offer an ideal opportunity to resolve the organ shortage that plagues patients in need of donor organs. Xenotransplantation, which is the transplantation of organs across species, would allow for this limitless supply of donor organs, and there has been a tremendous resurgence of interest over the past decade in the clinical potential of xenotransplantation using genetically manipulated swine donors.

My research laboratory is primarily focused on resolving the organ shortage and on developing strategies that allow for the transplantation of organs without the use of immunosuppressive drugs (i.e. “tolerance”) by “re-teaching” the body’s immune system to accept the donated graft. We utilize large animal preclinical models, consisting of inbred MHC-defined miniature swine and nonhuman primates, that directly translate into the development of relevant clinical strategies. Our focus on resolving the shortage of transplantable organs has led to three major projects: restoring the function of marginal organs (lungs and kidneys), xenotransplantation, and, more recently, reseeding decellularized organs using regenerative technology in inbred MHC-defined miniature swine. In this lecture, I will address the organ shortage issue and review recent endeavors in xenotransplantation and reseeding decellularized organs and will discuss our exciting achievement of a 3-month survival of life-supporting xenogeneic renal grafts with normal creatinine levels in nonhuman primates using life-supporting alpha-galactosyltransferase gene-knockout (GalT-KO) pig kidneys co-transplanted with vascularized thymic grafts (tolerance inducing regimens)..

Inviter: Prof. Yukihiro Inomata. Pediatric Surgery & Transplantation（小児外科学・移植外科学分野）

e-mail: yino@fc.kuh.kumamoto-u.ac.jp

Student Affairs Sec.: iyg-igaku@jimu.kumamoto-u.ac.jp

Kazuhiko Yamada, MD, PhD.

- Director, Center for Advanced Biomedical Science and Swine Research, Kagoshima University, JAPAN
- Professor, Kagoshima University, Graduate School of Medical and Dental Sciences, Organ Replacement and Xenotransplantation Surgery

Email: kyyamada@m2.kufm.kagoshima-u.ac.jp

Kazuhiko Yamada, MD. PhD. Bio:

After Dr. Yamada qualified as a board certified urologist in Japan, he joined the Transplantation Biology Research Center, Massachusetts General Hospital, USA as a research fellow in 1994. He became a Group Leader in the Miniature Swine Transplantation Section and an Instructor of Surgery at Harvard Medical School in 1998. Dr. Yamada was promoted to Assistant Professor of Surgery in 2000 and to Associate Professor of Surgery in 2004 at Harvard Medical School. Dr. Yamada serves as a Councilor of IXA and he sits on the editorial board member of several major journals in the field of Transplantation. Nationally, he has served as Director, Department of Regenerative Medicine, National Cardiovascular Center (Research section), Osaka, Japan in 2002-2003. In 2006, he was promoted to full Professor, Graduate School of Medical and Dental Sciences, Organ Replacement and Xenotransplantation Surgery and Frontier Science Research Center at Kagoshima University. He conducts translational large animal research projects in both allogeneic and xenogeneic transplantation. More recently, he became Director, Center for Advanced Biomedical Science and Swine Research, Kagoshima University in 2012.

Dr. Yamada's current research interests focus on finding new means, especially using the thymus, for inducing tolerance to allogeneic and xenogeneic organ transplants in preclinical large animal models. He has developed innovative procedures to transplant thymus or islets as a vascularized graft, a so called vascularized thymic lobe (VTL), thymokidney (TK) (*JI 2000, PNAS 2004, PNAS 2006 etc*) or islet-kidney (IK) (*Diabetes 2004, AJT 2012 etc*) or thymo-islet-kidney (TIK). Utilizing newly established techniques, he has reported that vascularization permits the thymus and islets to function immediately after transplantation and induce transplant tolerance to kidneys, islets or hearts with the evidence of host thymopoiesis in the vascularized donor thymic grafts across fully allogeneic barriers in MHC-inbred miniature swine. Dr. Yamada has extended his strategies to xenotransplantation, and demonstrated longer than 80 days survival of life-supporting xenogeneic renal grafts with normal creatinine levels in baboons using GalT-KO pig kidneys co-transplanted with vascularized thymic grafts (*Nature Med 2005, AJT 2010 etc*).