

Symposium 9

Obesity and Cardiovascular Health

Chairpersons

Yoon-Sok Chung

Ajou University, Korea

Do Thi Ngoc Diep

Vietnam Nutrition Association, Vietnam

Speakers

Richard Kibbey

Yale University, USA

Kyung-Hee Kim

Incheon Sejong Hospital, Korea

Jonathan Bennett

University of Hawaii Cancer Center, USA

Panel Discussion

Bumjo Oh

Seoul National University, Korea

Jun Hwa Hong

Eulji university, Korea



Richard Kibbey

Yale University, USA

• Education

Period	Affiliation	Position
- 2007	Yale School of Medicine	Endocrinology Fellowship
- 2002	Yale School of Medicine	Intern/ Resident Internal Medicine
- 2000	University of Texas Southwestern Medical School	M.D.
- 2000	University of Texas Southwestern Medical School	Ph.D.

• Affiliations / Experience

Period	Affiliation	Position
- 2023-Present	Yale School of Medicine	Professor with tenure

• Publications

- Matthew J. Merrins, Richard G. Kibbey, Glucose Regulation of β -Cell KATP Channels: It Is Time for a New Model! *Diabetes* 2024;73(6):856–863, <https://doi.org/10.2337/dbi23-0032> PubMed: 38768366
- Matthew J Merrins 1, Barbara E Corkey 2, Richard G Kibbey 3, Marc Prentki 4 Metabolic cycles and signals for insulin secretion. *Pubmed* PMID: 35728586 PMCID: PMC9262871, DOI: 10.1016/j.cmet.2022.06.003
- Abulizi A, Cardone RL, Stark R, Lewandowski SL, Zhao X, Hillion J, Ma L, Sehgal R, Alves TC, Thomas C, Kung C, Wang B, Siebel S, Andrews ZB, Mason GF, Rinehart J, Merrins MJ, Kibbey RG. Multi-Tissue Acceleration of the Mitochondrial Phosphoenolpyruvate Cycle Improves Whole-Body Metabolic Health. *Cell Metab.* 2020;32(5):751-66 e11. Epub 2020/11/05. doi: 10.1016/j.cmet.2020.10.006. PubMed PMID: 33147485; PMCID: PMC7679013
- Lewandowski SL, Cardone RL, Foster HR, Ho T, Potapenko E, Poudel C, VanDeusen HR, Sdao SM, Alves TC, Zhao X, Capozzi ME, de Souza AH, Jahan I, Thomas CJ, Nunemaker CS, Davis DB, Campbell JE, *Kibbey RG, *Merrins MJ. Pyruvate 224 Kinase Controls Signal Strength in the Insulin Secretory Pathway. *Cell Metab.* 2020;32(5):736-50 e5. Epub 2020/11/05. doi: 10.1016/j.cmet.2020.10.007. PubMed PMID: 33147484; PMCID: PMC7685238
- Alves TC, Pongratz RL, Zhao X, Yarborough O, Sereda S, Shirihai O, Cline GW, Mason G, Kibbey RG*. Integrated, step-wise, mass-isotopomeric flux analysis of the TCA cycle. *Cell Metabolism* 2015;22(5):936-47. PMC4635072

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Reconsidering the Role of Mitochondria in Nutrient Sensing

Richard Kibbey (Yale University, USA)

The nutrient environment has to first be “sensed” if cellular, tissue, and organismal metabolic homeostasis are to be maintained. Some signals, such as insulin, glucagon, and GLP-1, work through cell surface receptors. But, for such hormones to be secreted, nutrient sensing cells must first utilize metabolism-based “sensing” of nutrients like glucose, amino acids and fats. Oxidative synthesis of ATP by the mitochondria (OxPhos) has largely been ascribed the role of transmitting nutrient levels to the secretory apparatus. If such a system were even bioenergetically possible, it would make them perilously susceptible to death when energy levels are low. However, the first human inborn error in mitochondrial metabolism that impacted insulin secretion, GDHH545Y, indicated there must be another explanation that did not involve OxPhos. Instead of making ATP, the cell’s metabolism has been rewired to make the much higher energy containing metabolite phosphoenolpyruvate in the PEP cycle that is then triggers the depolarization that releases insulin. This revised role of how mitochondria are involved in energy sensing throughout the body has important implications for balancing energy storage and utilization.



Kyung-Hee Kim

Incheon Sejong Hospital, Korea

• Education

Period	Affiliation	Position
– 2016	Seoul National University	Ph.D.
– 2013	Seoul National University	M.S.
– 2004	University of medicine	M.D.

• Affiliations / Experience

Period	Affiliation	Position
– 2019-Present	Mayo Clinic, Rochester, USA	Visiting and Research doctor
– 2013-Present	Sejong Hospital	Director of Heart Transplantation
– 2020	Penn state hospital, USA	Visiting and Research doctor
– 2015	Incheon Sejong Hospital	Director of Heart Transplantation
– 2014	Drexel University Hospital, USA	Visiting and Research doctor

• Committee Memberships

- ISHLT guideline update Task Force 3 co-chair
- ISHLT 2020 Program Committee
- ISHLT Committee
- Korean Society of Echocardiography
- Korean Society of Heart Failure, Outreach Committee, Education Committee

• Publications

- Artificial intelligence-enhanced smartwatch ECG for heart failure-reduced ejection fraction detection by generating 12-lead ECG
- Sex Differenced in Diastolic Function and Long-term Clinical Outcomes in Patient With Peripheral Artery Disease Who Underwent Percutaneous Transluminal Angioplasty: Single
- Applicable Machine Learning Model for Predicting Contrast-induced Nephropathy Based on Pre-catheterization Variables
- The International Society for Heart and Lung Transplantation (ISHLT) guidelines for the care of heart transplant recipients
- Optimizing Outcomes for Post-ECMO Heart Transplant Patients in South Korea: Addressing Multi-Organ Failure and Allocation Challenges

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Bariatric Surgery in Patients with Advanced Heart Failure

Kyung-Hee Kim (Incheon Sejong Hospital, Korea)

Background:

Obesity is increasingly recognized as a critical factor complicating the management of advanced heart failure (HF). The intersection of obesity and HF presents unique challenges, especially in patients requiring advanced therapies such as left ventricular assist devices (LVADs) and heart transplantation. Obesity not only exacerbates the hemodynamic and metabolic demands on the failing heart but also increases the risk of post-transplant complications, such as graft failure and infections. As bariatric surgery has emerged as a viable treatment option for severe obesity, its role in the management of advanced heart failure patients is gaining attention. This review lecture will discuss the clinical benefits, challenges, and current evidence surrounding the use of bariatric surgery in this high-risk population.

Objectives:

This lecture aims to provide a comprehensive overview of the following topics:

1. The impact of obesity on the progression of advanced heart failure and its implications for treatment strategies.
2. The role of bariatric surgery in improving candidacy for heart transplantation by addressing obesity-related contraindications.
3. The effects of bariatric surgery on the management and outcomes of patients with LVADs, including potential reductions in device-related complications.
4. The considerations for perioperative and postoperative management of advanced heart failure patients undergoing bariatric surgery, with an emphasis on cardiac optimization, mechanical circulatory support, and multidisciplinary care.

Key Findings:

The existing evidence suggests that bariatric surgery can lead to significant weight loss and improvements in comorbid conditions, such as diabetes and hypertension, which are pivotal in managing advanced heart failure. Studies indicate that post-bariatric surgery weight reduction can enhance cardiac function, decrease pulmonary artery pressures, and improve right ventricular performance. These benefits are particularly relevant for heart transplantation candidates, as achieving a lower BMI can enhance transplant candidacy and reduce perioperative risks. In patients with LVADs, bariatric surgery may reduce the incidence of device-related complications, such as driveline infections and systemic inflammation, by decreasing overall body mass and improving metabolic health.

Challenges and Considerations:

While bariatric surgery offers promising benefits, the procedure in heart failure patients carries substantial risks, particularly related to perioperative management and postoperative recovery. Advanced heart failure patients, especially those requiring LVAD support or listed for transplantation, need tailored preoperative optimization and close monitoring for complications such as hemodynamic instability, wound healing issues, and respiratory failure. A multidisciplinary approach involving cardiologists, cardiothoracic surgeons, bariatric surgeons, anesthesiologists, and nutritionists is critical to ensuring successful outcomes in this complex patient population.

Conclusion:

Bariatric surgery represents a potential pathway to improving outcomes in patients with advanced heart failure, particularly those who are candidates for heart transplantation or LVAD therapy. The procedure can alleviate the adverse effects of obesity on heart failure and improve the overall health status of these patients. However, the risks associated with bariatric surgery in this fragile population require meticulous perioperative planning and interdisciplinary collaboration. Future studies should focus on long-term outcomes, including transplant-free survival, quality of life, and the durability of cardiac improvements following weight loss.



Jonathan Bennett

University of Hawaii Cancer Center, USA

• Education

Period	Affiliation	Position
– 2023	University of Hawaii, Manoa	Ph.D.
– 2012	California State University, Long Beach	M.S.
– 2009	Northern Illinois University	B.S.
– 2009	Northern Illinois University	B.S.

• Affiliations / Experience

Period	Affiliation	Position
– 2023-Present	University of Hawaii Cancer Center	Researcher

• Committee Memberships

- International Society of Clinical Densitometry
- International Atomic Energy Agency
- International Body Composition Symposium

• Publications

- Bennett JP, Liu YE, Quon BK, Kelly NN, Wong MC, Leong L, ... & Shepherd JA (2022). Three-dimensional optical body shape and features improve prediction of metabolic disease risk in a diverse cross-sectional sample of adults. *Obesity*, 30(8), 1589-1598
- Bennett JP, Cataldi D, Liu YE, Kelly NN, Quon BK, ... & Shepherd JA (2024). Development and validation of a rapid multicompartiment body composition model using 3-dimensional optical imaging and bioelectrical impedance analysis. *Clinical Nutrition*, 43(2), 346-356
- Bennett JP, Prado CM, Heymsfield SB, & Shepherd JA (2024). Evaluation of visceral adipose tissue thresholds for elevated Metabolic Syndrome risk across diverse populations: A systematic review. *Obesity Reviews*, e13767
- Bennett JP, Ford KL, Siervo M, Gonzalez MC, Lukaski HC, Sawyer MB, Deutz NEP, Shepherd JA, & Prado CM (2024). Advancing body composition assessment in patients with cancer: First comparisons of traditional versus multicompartiment models. *Nutrition*, 125: 112494
- Garber AK, Bennett JP, Wong MC, Ng BK, Maskarinec G, ... & Shepherd JA (2023). Cross-sectional assessment of body composition and detection of malnutrition risk in participants with low Body Mass Index and eating disorders using 3D optical surface scans. *American Journal of Clinical Nutrition*, 118(4), 812-821

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Body Composition and Its Associations with Disease Risk: Measures, Assessment Techniques, and Future Directions

Jonathan Bennett (University of Hawaii Cancer Center, USA)

The proportions of fat, muscle, and bone that make up overall body weight serve as a reflection of lifelong diet and physical activity. Measurement of these body composition components is essential to nutrition assessment as the quantification of these components can identify over/undernutrition, monitor growth and development, and track changes related to disease progression or treatment. The assessment of body composition therefore plays an integral role in the assessment of disease risk (e.g.; cardiovascular disease, type II diabetes, cancer) across the lifespan.

Body composition assessment methods continue to develop in terms of their feasibility and practicality, as well as the number and types of features available. Tools such as dual energy X-ray absorptiometry, bioelectrical impedance analysis, and 3-dimensional optical imaging are now providing measurements of body composition and disease risk that were previously only available in specialized settings. By measuring and monitoring these body composition components, clinicians can detect changes that are more strongly associated with disease risk compared to traditional assessments like Body Mass Index (BMI). The range of assessment methods can identify whole-body and regional muscle and fat as well as other components such as visceral fat that are more closely linked to cardiovascular disease risk.

Understanding body composition and its related measures can significantly enhance disease risk assessment and patient monitoring across clinical settings. The measurements obtained from these tools can support the creation of tailored treatment plans that consider an individual's unique body composition and goals. Additionally, they can provide valuable insights for public health strategies aimed at encouraging a health, weight management, and disease risk prevention. Areas for future development and improvement of these techniques include: improving the accuracy and features provided by body composition assessment methods, large-scale data collection of population health and features associated with disease risk, and the development of more comprehensive and accurate risk prediction models for various diseases.

This lecture will identify the current state of knowledge regarding key components of body composition useful for clinical monitoring of health and disease risk, highlight features and capabilities of various body composition assessment techniques, and identify areas for future research to improve the utility of body composition assessment across clinical and research settings.