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### Skeletal Muscle Phenotype in Patients Undergoing Long-Term Hemodialysis Awaiting Kidney Transplantation
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Tim J. Knobbe, Daan Kremer, Michele F. Eisenga, Marco van Londen, António W. Gomes-Neto, Rianne M. Douwes, C. Tijn Can, Eva Corpeleijn, Coby Annema, Gerjan Navis, Stelten P. Berger, and Stephan J.L. Bakker, on behalf of TransplantLines Investigators
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### COVID-19–Associated Mortality among Kidney Transplant Recipients and Candidates in the United States
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### Timing of Kidney Clamping and Deceased Donor Kidney Transplant Outcomes
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David Z.I. Cherney, Petter Bjornstad, Bruce A. Perkins, Julio Rosenstock, Dietmar Neubacher, Jan Marquard, and Nima Soleymanlou

### Humoral Response to mRNA versus an Adenovirus Vector-Based SARS-CoV-2 Vaccine in Dialysis Patients

## Kidney Transplantation Long-Term Management Challenges

### Chronic Allograft Injury
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### Recurrent Glomerular Disease after Kidney Transplantation: Diagnostic and Management Dilemmas
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On the Cover

Case Description
A 62-year-old male with a history of kidney failure secondary to vesicoureteral reflux on long-term hemodialysis (HD) presented for kidney transplant. He had been on hemodialysis for 3 years. There was no history of diabetes mellitus or arterial hypertension. Physical examination revealed asthenia, and the patient was overweight (29 kg/m²) without muscle atrophy but with a significant decrease in muscle endurance. Interestingly, 1 year after kidney transplant, the patient did not report tiredness. Muscle biopsy was performed just before the kidney transplant.

Image Description:
Transmission electron microscopy analysis on muscle biopsy showed sarcomeric disorganization and proteolysis in the vastus lateralis muscles of long-term HD patients (center). We also observe an altered repartition of mitochondria coupled with an increase of mitochondrial size (left and center). Furthermore, patients present mitochondria with swelling or disrupted internal structures. Mit, mitochondria; Z, Z-line; C, control; P, patient. Scale bar 500 nm.

Teaching Points:
In HD patients, cellular muscle abnormalities are difficult to understand because of comorbidity, malnutrition, age, or sedentary lifestyle. In order to overcome these confounding factors, muscles were analyzed in highly selected HD patients undergoing kidney transplantation who were free of major comorbidities. Our study describes a specific muscle dysfunction characterized by a transition from type 1 (aerobic) to type 2 (anaerobic) muscle fibers without proteasome activation. Moreover, we observed alteration of mitochondria structure related to mitochondrial dysfunction through the activation of autophagy and mitophagy. These observations strongly suggest an energy deficiency in oxidative muscle and could explain the impaired endurance observed in long-term HD patients free of malnutrition and major comorbidities. (Images and text provided by Fabrice Raynaud, Montpellier University, INSERM, Montpellier, France)
The cover image can be found in this issue of CJASN as Figure 3 A and C in the article titled “Skeletal Muscle Phenotype in Patients Undergoing Long-Term Hemodialysis Awaiting Kidney Transplantation,” by Dr. Jean-Sebastien Souweine and colleagues on pages 1676–1685 (doi: 10.2215/CJN.02390221).