As the Director of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), I am pleased to present this annual report highlighting the research efforts and programs supported by the Institute. The NIDDK has a broad research responsibility that includes some of the most common, debilitating, and costly conditions affecting Americans. These conditions include diabetes and other endocrine and metabolic diseases; liver disease and other digestive diseases and conditions, such as inflammatory bowel disease and irritable bowel syndrome; nutritional disorders and obesity; kidney diseases, such as polycystic kidney disease; urologic diseases and conditions, such as interstitial cystitis/bladder pain syndrome and prostatitis; and hematologic diseases.

The 17th edition of this report illustrates recent NIDDK-supported scientific advances, such as:

- That controlling blood glucose early in the course of type 1 diabetes preserves heart health and reduces premature death
- A method for using cells from people with type 1 diabetes to make new β (beta) cells, for potential use in treating their disease
- That there are subtypes of β cells with differing properties, and the balance between them shifts as type 2 diabetes progresses
- Identification of a molecule produced during exercise that promotes physical endurance
- An insight into the pathogenesis of cystic fibrosis that may lead to improved approaches for preventing debilitating lung infections
- Multiple discoveries about ways the brain regulates appetite and digestion
- Explorations into potential new directions in obesity treatment
- How both food choices and timing may influence how much we eat
- Multiple revelations about how children’s gut microbiomes are affected by factors such as nutrition, antibiotics, and Crohn’s disease treatments
- Advancing our understanding of brain responses associated with irritable bowel syndrome and of the impact of stress early in life on this painful condition
• A better understanding of the etiology of pancreatitis in women and in children

• Understanding causes of liver disease and identifying pathways that could be therapeutically targeted to improve liver health

• Understanding artery hardening during chronic kidney disease and kidney deterioration during healthy aging

• Treating kidney stones with novel ultrasound technology, and potentially preventing them by a gene-silencing approach

• That kidney transplants from tissue-non-compatible live donors can improve survival compared to remaining on a donor waiting list or receiving a transplant from a tissue-compatible deceased donor

In addition to reporting on recent advances, this publication traces the multi-step path to research achievements through several “Stories of Discovery” and “Scientific Presentations.” These essays illustrate how major new discoveries that have greatly advanced biomedical science and are benefiting human health often emerge from many incremental insights gained from research investments spanning many years and even multiple research disciplines.

This report also includes personal stories of those who have given time and effort to participate in NIDDK-sponsored clinical research or whose lives have been transformed by biomedical research. Sisters with type 1 diabetes share their enthusiasm for an artificial pancreas, like the ones they helped test. A man tells his story of survival despite acute liver failure brought on by Reye syndrome. A physician-scientist describes his own participation in a trial to prevent diabetic kidney disease. A man traces how a lifetime in public health extended naturally into his own participation in a trial to determine how best to treat type 2 diabetes.

The NIDDK continues efforts to ensure that knowledge gained from its research is disseminated to health care providers, patients, and the public. We develop science-based information on diseases and disorders within the NIDDK mission and distribute it through our information and education programs and our website.

The efforts featured in this publication reflect the core mission of the NIDDK, including the Director’s guiding principles:

• Maintain a vigorous investigator-initiated research portfolio
• Support pivotal clinical studies and trials
• Preserve a stable pool of talented new investigators
• Foster exceptional research training and mentoring opportunities
• Ensure knowledge dissemination through outreach and communications

More information on how the NIDDK’s activities support these core values can be found in the “NIDDK Funding Trends and Support of Core Values” section at the end of this report and on our website at www.niddk.nih.gov
I invite you to visit us at www.niddk.nih.gov Health information, news, and scientific advances related to NIDDK research are also available on our Twitter feed: @NIDDKgov

This report reflects only a fraction of the immense body of NIDDK-funded research across the country, performed by basic scientists, clinical investigators, and patient volunteers. Moving forward, we remain committed to supporting these important areas of research and translating scientific discoveries into improvements in the health and quality of life of all people.

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