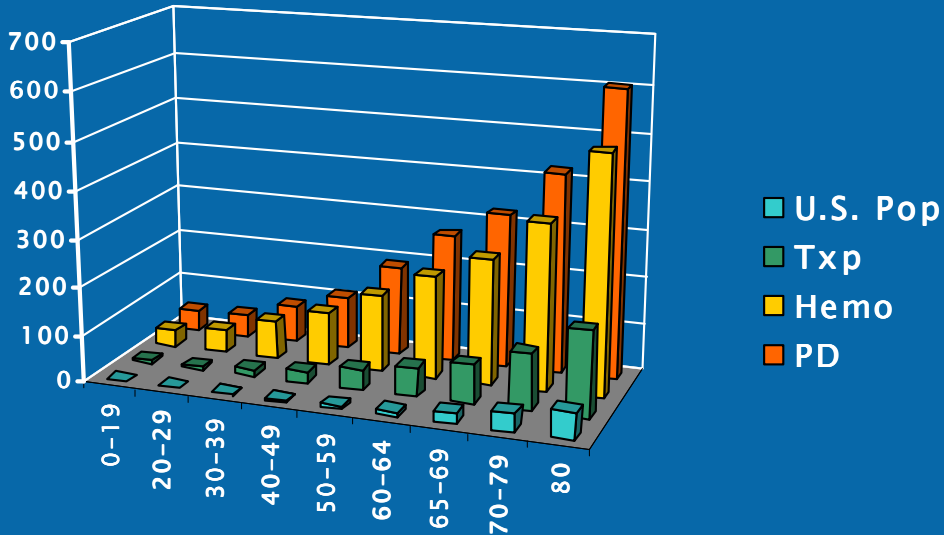
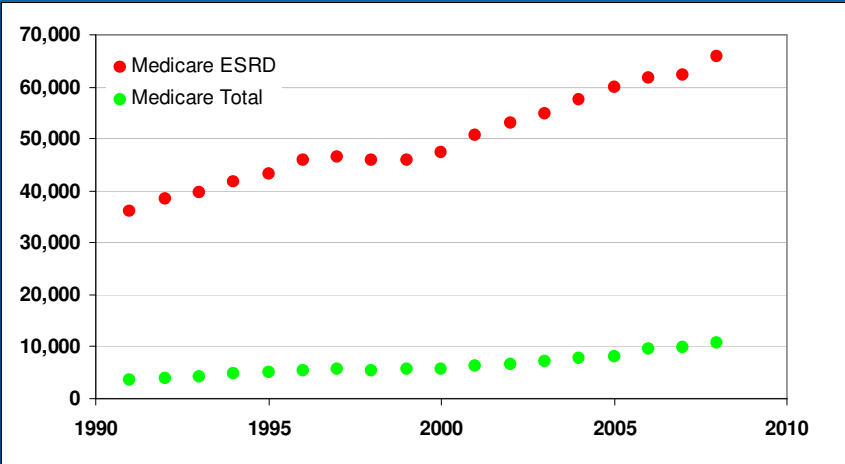
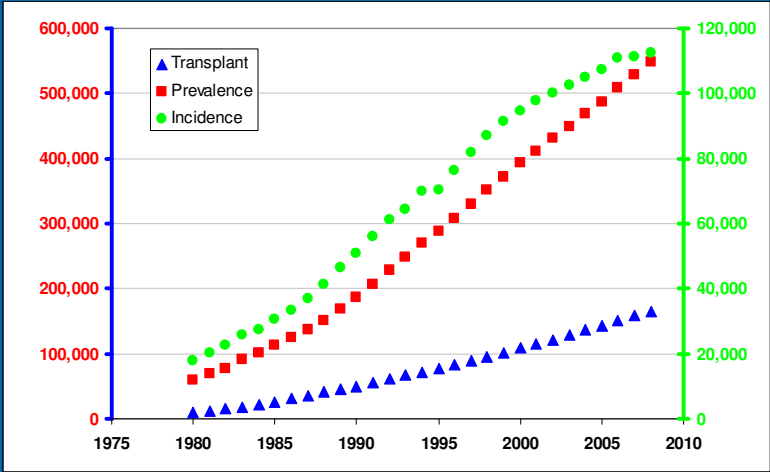




# Silicon Nanotechnology and Hemofiltration Membranes

September 30, 2011  
William H. Fissell, MD

# The Problem (1)



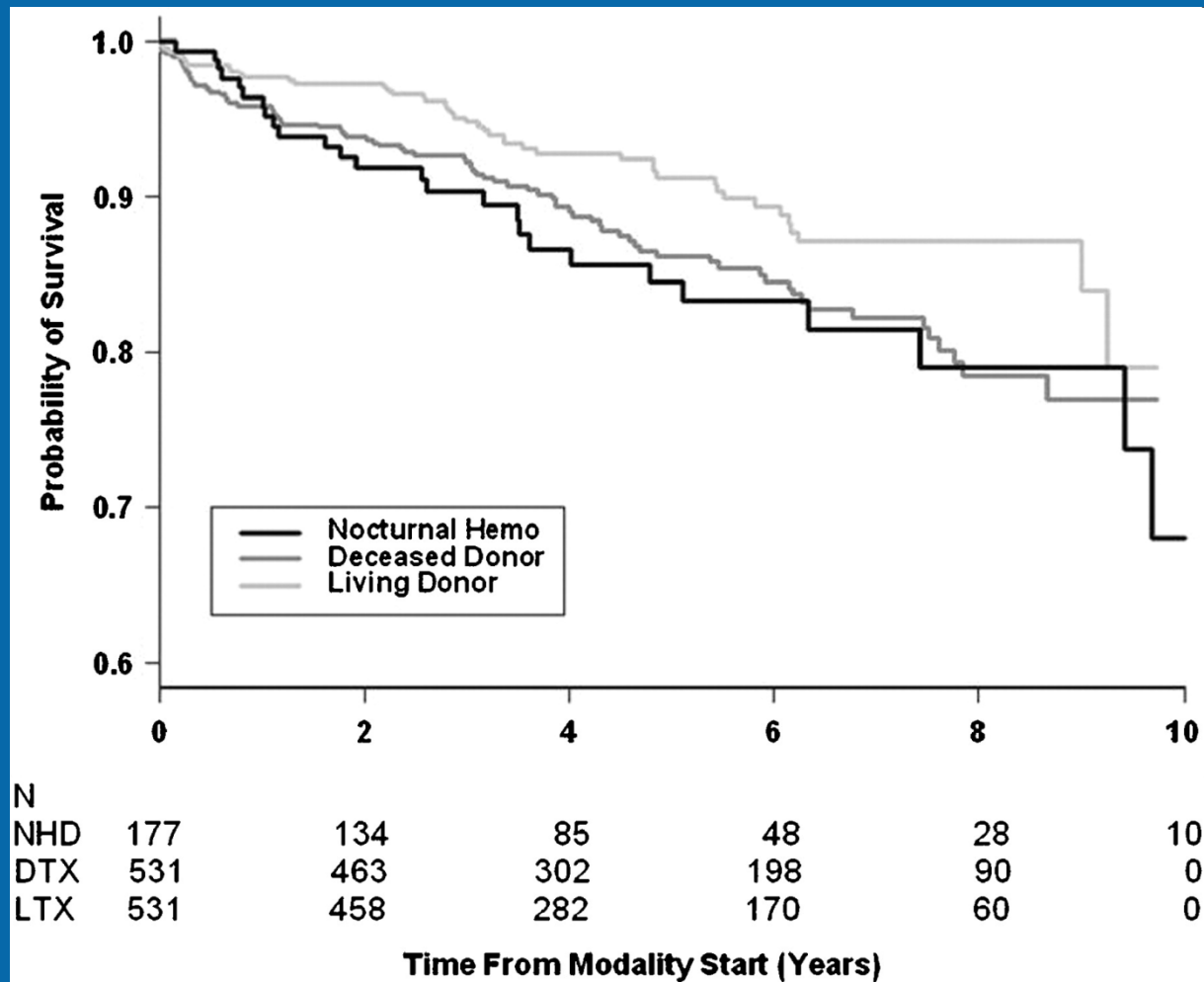
# Benefit From Higher Dose: The Solution?

## The London Daily/Nocturnal Hemodialysis Study,

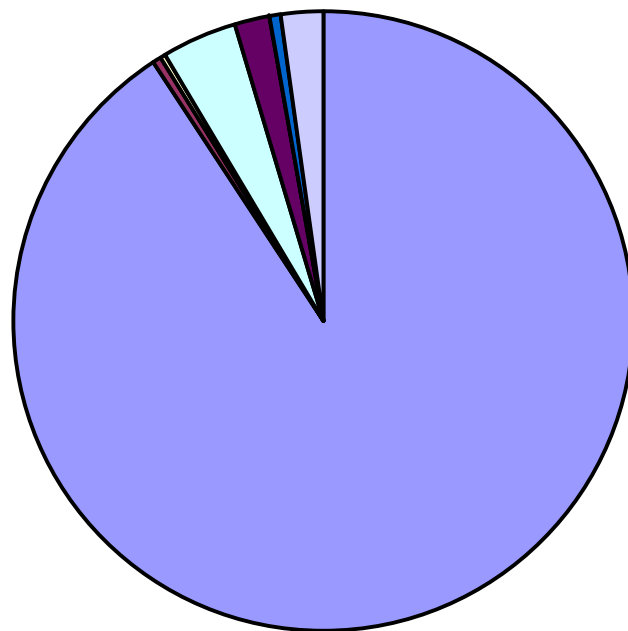
a prospective, comparative, nonrandomized study, directly compared outcomes of quotidian (daily) hemodialysis patients with conventional thrice-weekly hemodialysis patients. Significant clinical improvements were seen with quotidian therapy in the areas of nutrition (short-hours daily), blood pressure (both), volume control (short-hours daily), calcium/phosphorus control (nocturnal), and quality of life (both). A nonsignificant trend for improvement in anemia management was suggested. The economic analysis showed substantial savings in annualized cost per quality-adjusted life-year in changing from conventional hemodialysis (carried out in-center, in satellite units, or at home) to home quotidian hemodialysis.

**The substantial clinical benefits of home quotidian hemodialysis, combined with the economic advantage shown by this study, clearly justify its expansion.**

# Benefit From Higher Dose: The Solution?



# Barriers to Higher Dose



- Center hemo
- Center self hemo
- Home hemo
- CAPD
- CCPD
- Other PD
- Uncertain dialysis
- Uncertain Transplant

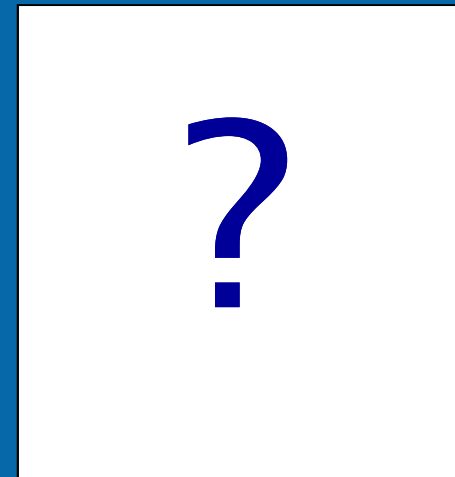
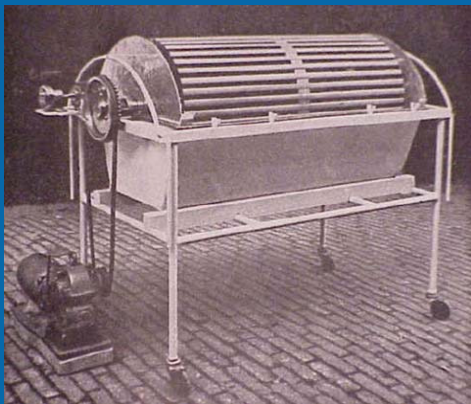
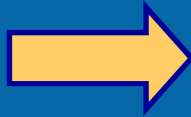
# Barriers to Higher Dose

## Patient-Perceived Barriers to the Adoption of Nocturnal Home Hemodialysis

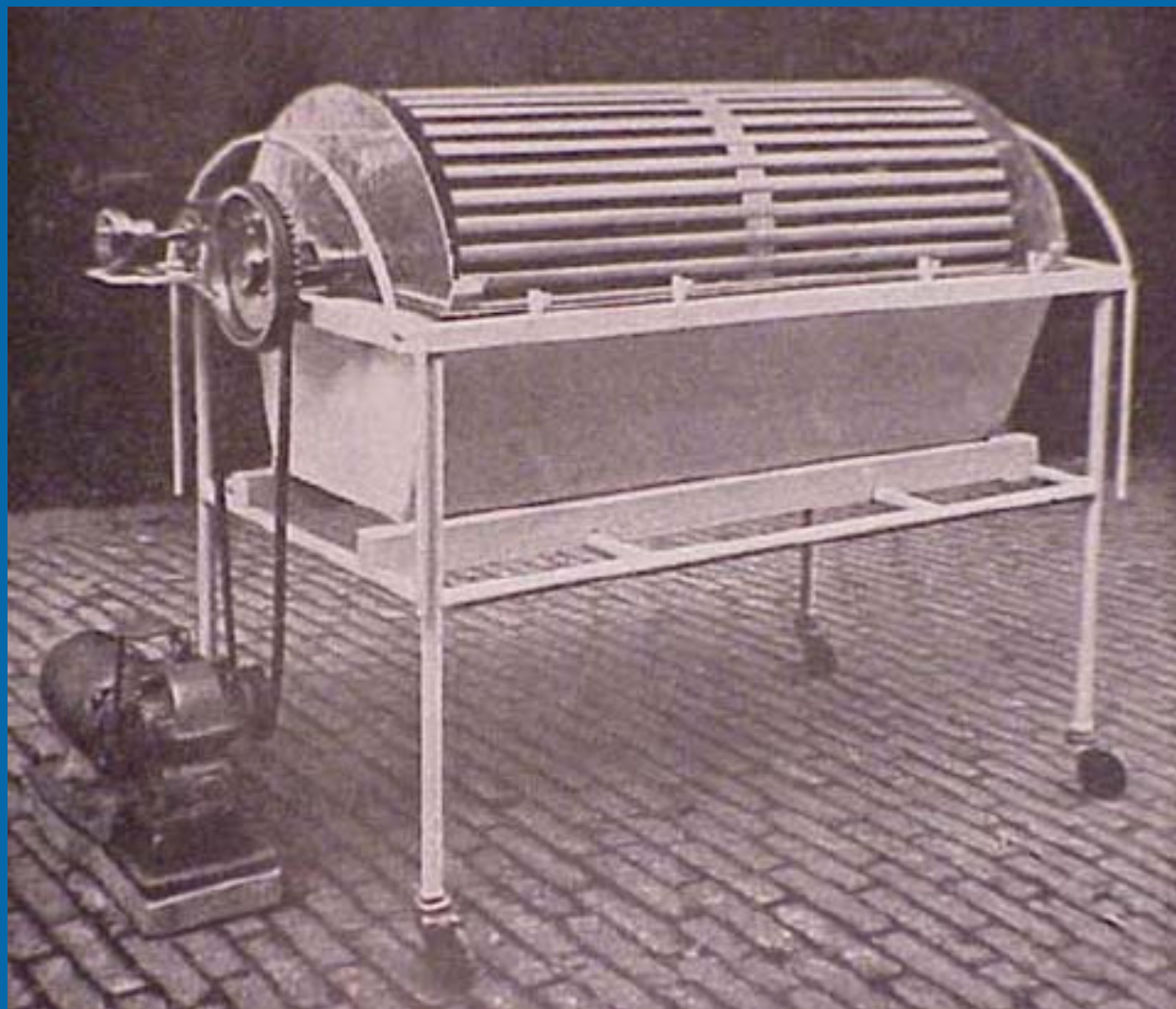
Joseph A. Cafazzo,<sup>\*†‡</sup> Kevin Leonard,<sup>\*†</sup> Anthony C. Easty,<sup>\*‡</sup> Peter G. Rossos,<sup>\*§</sup> and Christopher T. Chan<sup>§</sup>

*\*Centre for Global eHealth Innovation, Toronto General Hospital, University Health Network; †Health Policy, Management and Evaluation, Faculty of Medicine, University of Toronto; ‡Department of Medicine, University Health Network, Faculty of Medicine, University of Toronto; §Institute of Biomaterials and Biomedical Engineering, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada*

# Arrhythmia Care as a Paradigm for the 21<sup>st</sup> Century

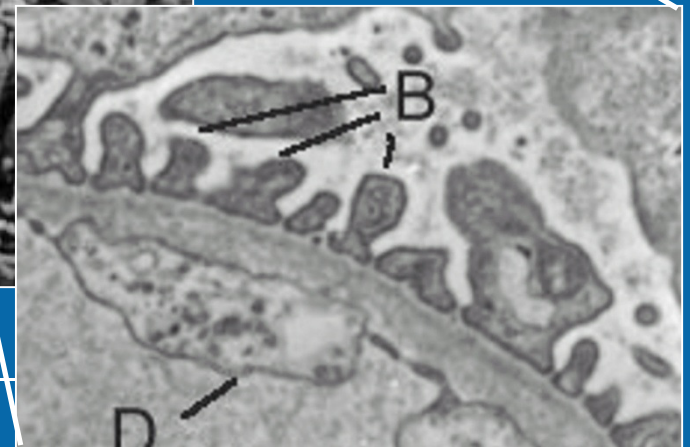
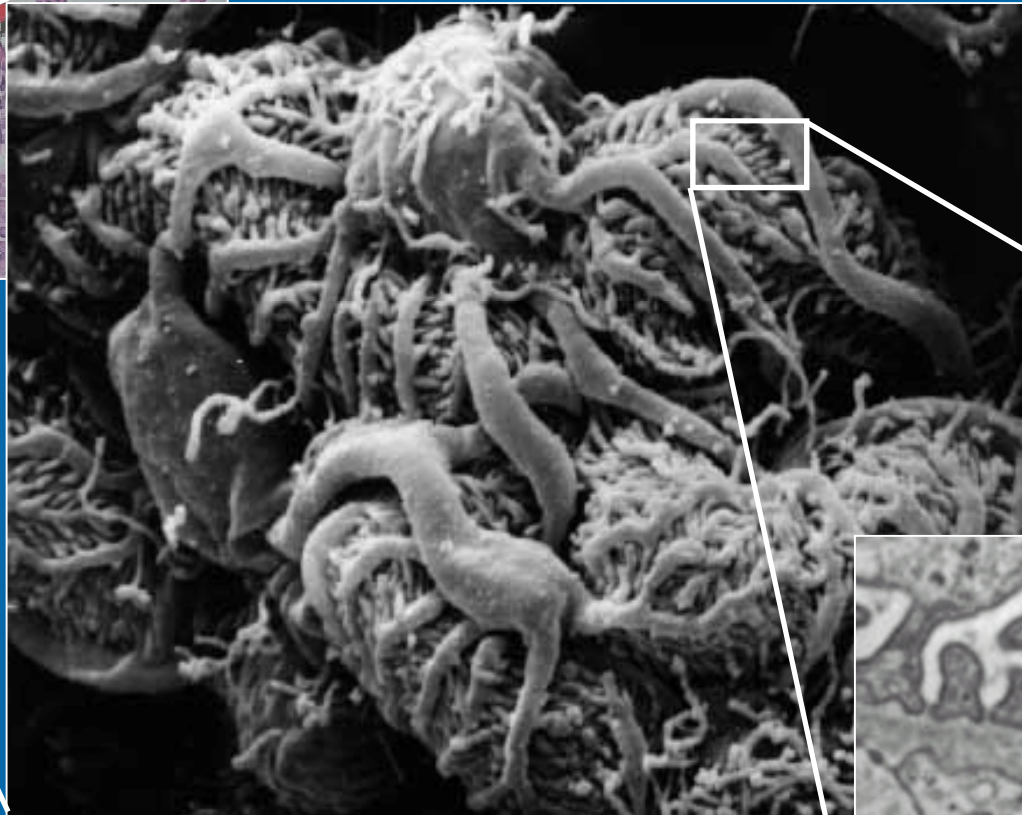
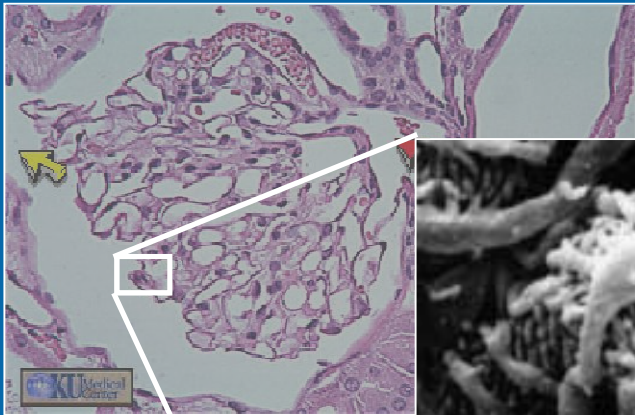


# Miniaturization?

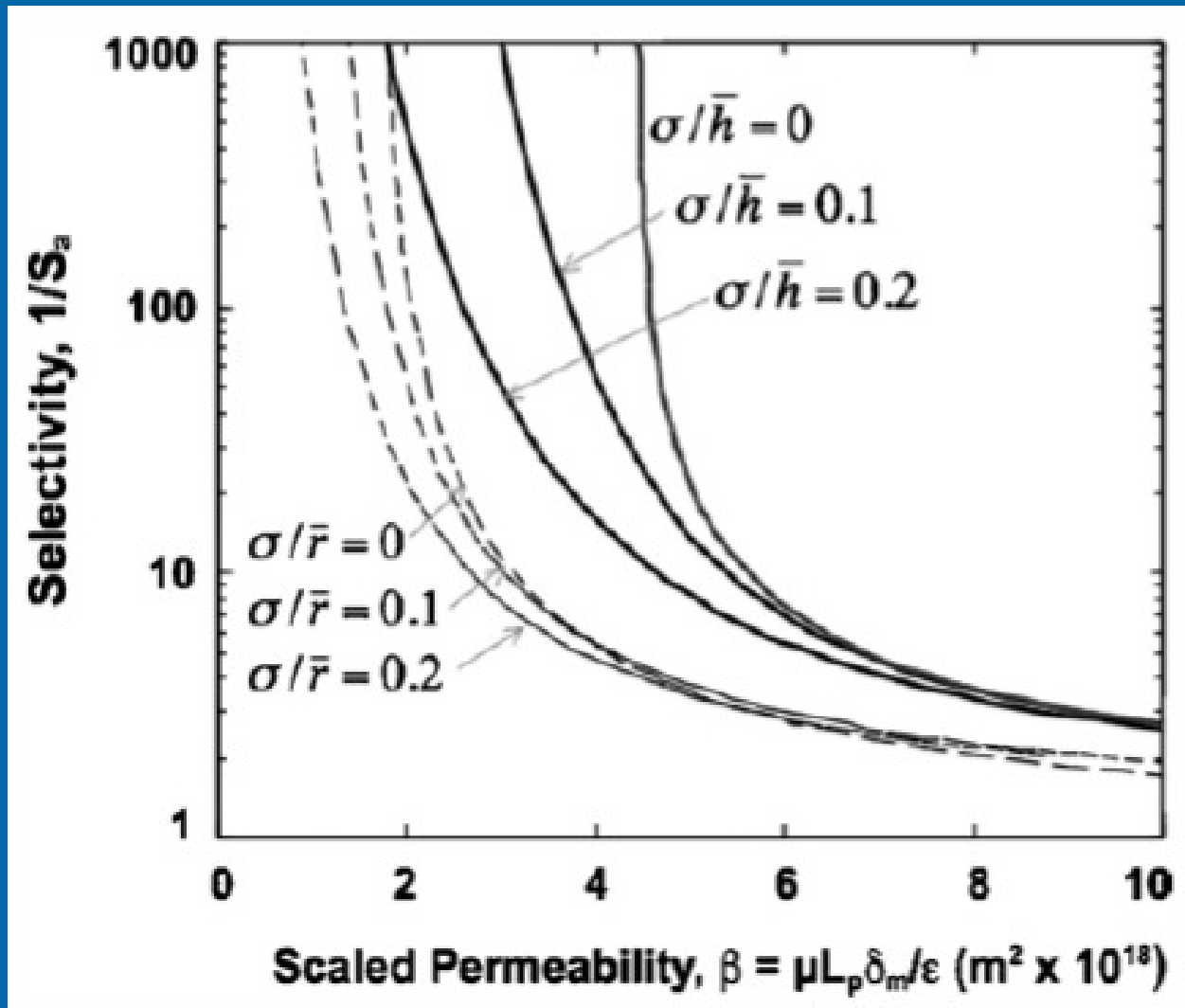




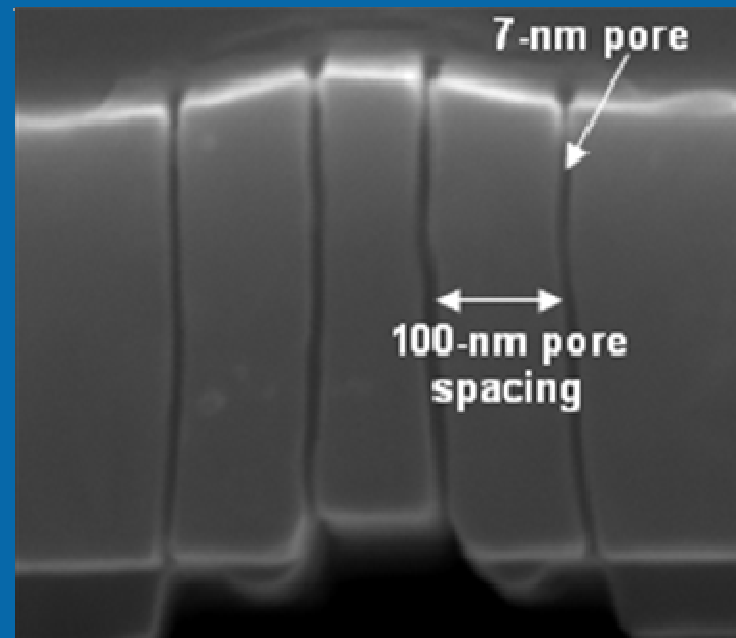
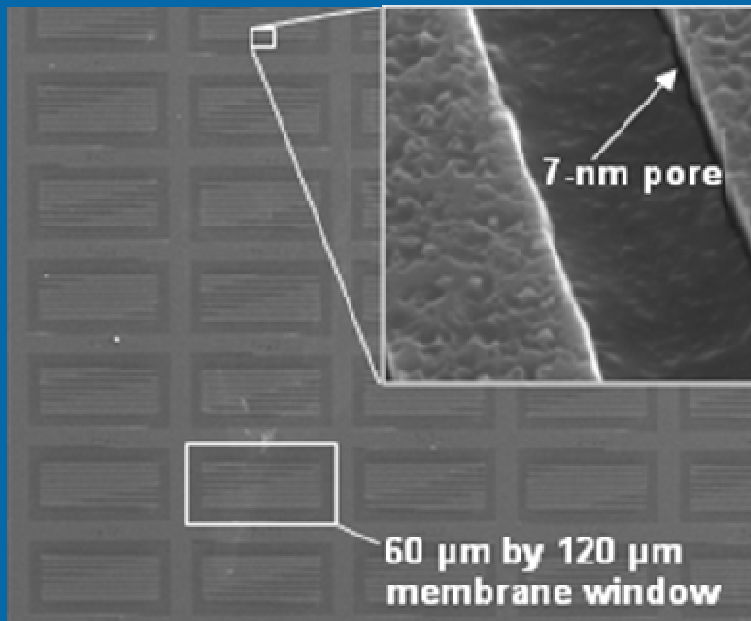
# The Kidney's Natural Hemofilter



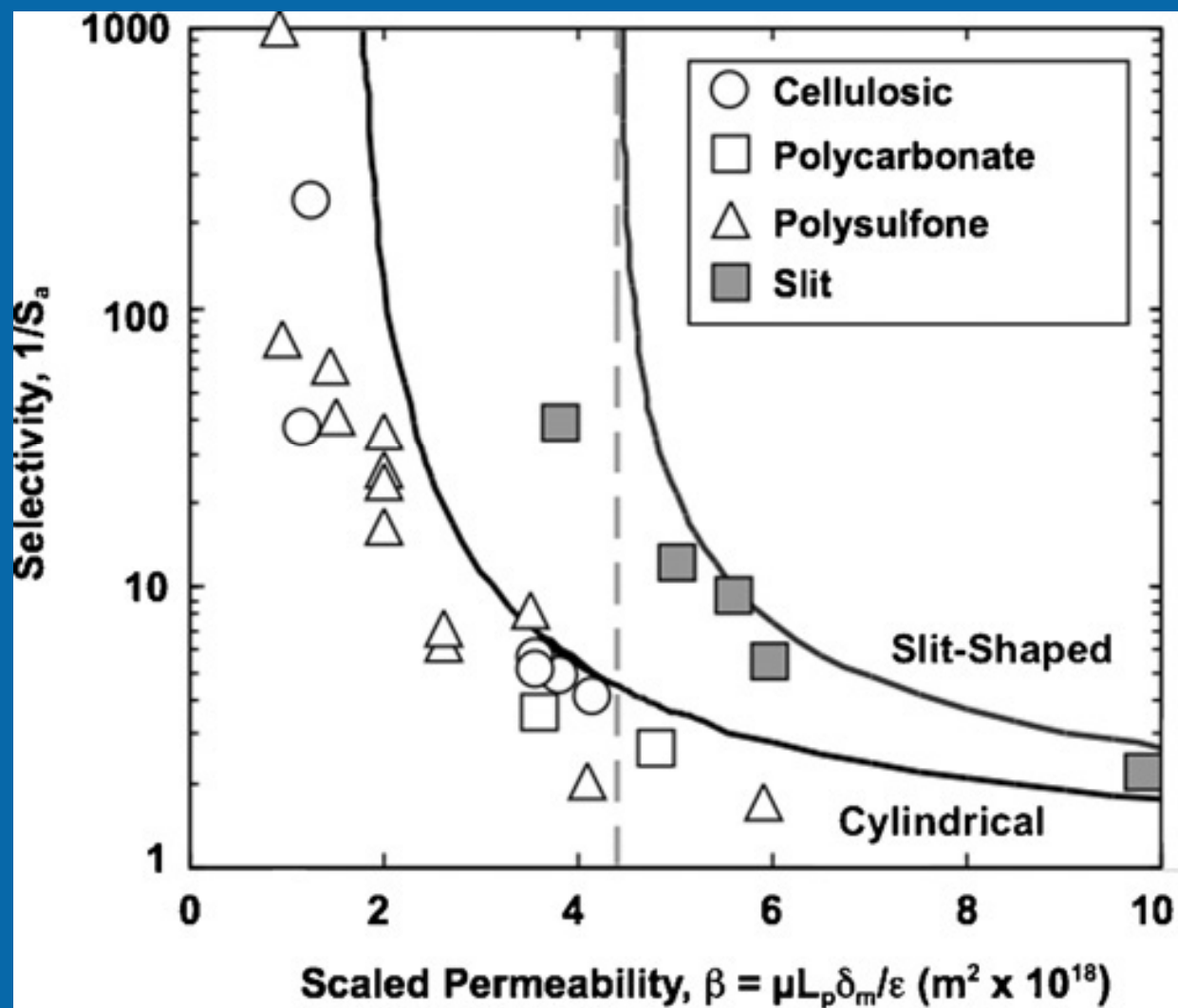
# Uniformity of Pores and Shape of Pores Control Selectivity



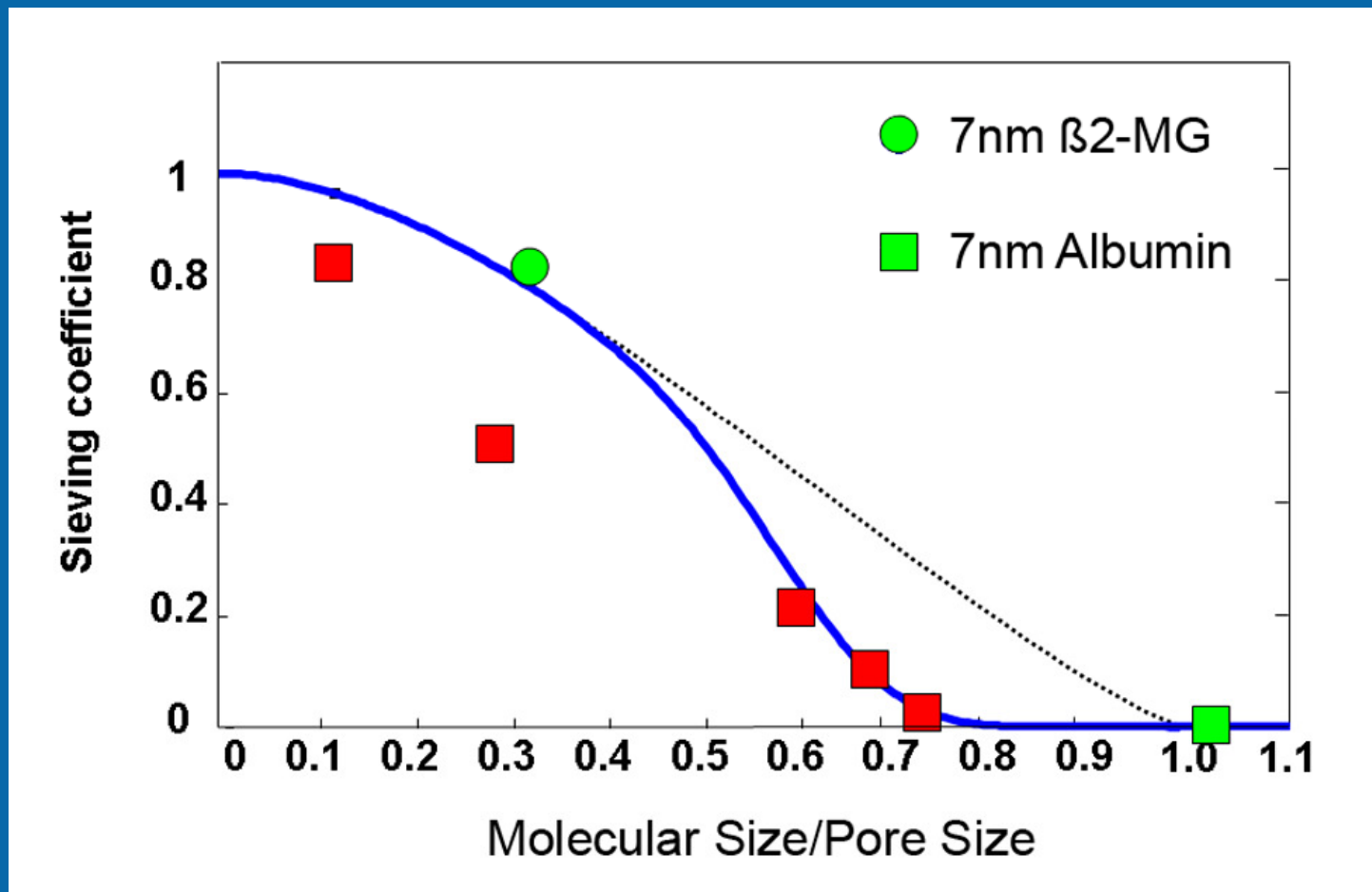
# Silicon Nanopore Membrane



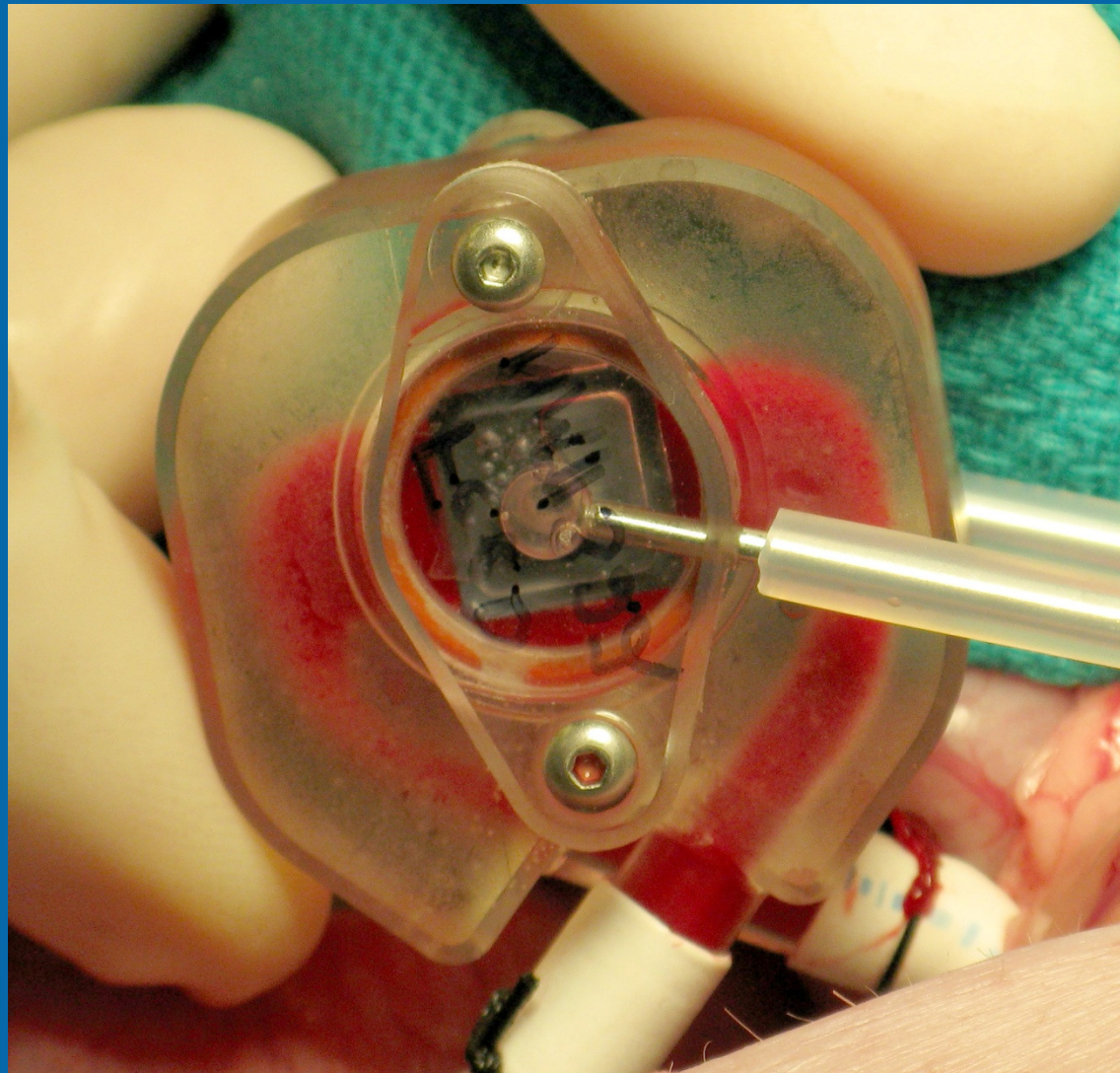
# Enhanced Selectivity of Slit Pores



# Silicon Nanopore Membrane: Selectivity



# Large Animal Hemofilter Implantation





# Acknowledgements

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- Cleveland Clinic Foundation

**“One must not stay within the lines”- Eric Carle**

