

## The following research summary was prepared by ASF's Volunteer Research Program Chair and Board of Directors member, B. André Weinstock, PhD, MSAS.

Pokidysheva EN, Redhair N, Ailsworth O, et al. <u>Collagen IV of basement membranes: II. Emergence of</u> <u>collagen IVα345 enabled the assembly of a compact GBM as an ultrafilter in mammalian kidneys</u>. *J. Biol. Chem.* (2023) 299 (12). **DOI**: <u>https://doi.org/10.1016/j.jbc.2023.105459</u> (open access)

Axolotls are a type of Mexican salamander that never outgrow their juvenile tadpole stage, live in the water their whole lives, and retain their external gills ... and "cute" smile. While extremely rare in the wild, axolotls are a staple of biological research labs around the world. In this month's highlighted journal article by Pokidyshiva et al., axolotls are one of the species – along with sharks, mice, and humans – whose kidneys are examined for the root causes of Alport syndrome.

The authors describe the comparative biology and evolution of the kidneys' glomerular basement membrane (GBM) in vertebrate animals. Unique to adult mammals is a very thin, yet strong and flexible GBM composed of a core collagen IV $\alpha$ 345 network. It is hypothesized that this unique core endows adult mammals the ability to maintain constant blood chemistry and pressure in a diverse array of environments from the very dry (kangaroo rats) to the depths of the ocean (humpback whales) and more. However, mammals are not born with a collagen IV $\alpha$ 345 network. In development through childhood, mammals start with a simpler "baby" collagen IV $\alpha$ 345 network, which is more akin to GBMs seen in fish and amphibians. Only as mammals grow into adulthood is their "baby"  $\alpha$ 112 GBM replenished with an "adult"  $\alpha$ 345 GBM. In Alport syndrome this replenishment does not occur fully or in part. As such, kidneys of fish and amphibians, such as the axolotl, can offer novel models of Alport-impaired kidneys to better our scientific understanding of the disease.

Dr. Billy G. Hudson, Professor at Vanderbilt University and a founding member of ASF's <u>Scientific</u> <u>Advisory Research Network</u>, is the final author of the paper.