Nanomaterial filters bacteria from water

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BUFFALO, N.Y., Feb. 22 (UPI) -- U.S. researchers say a newly developed nanomaterial could help solve the age-old public health problem of removing harmful bacteria from drinking water.

Working with a special kind of polymer called a block copolymer, researchers at the University of Buffalo have synthesized a filter nanomembrane containing pores large enough for water to slip through easily but too small for bacteria, a UB release reported Monday.

Water molecules and bacteria are both measured in nanometers, a unit of length 100,000 times thinner than the width of a human hair.

A single water molecule is less than a nanometer wide, while even the most diminutive bacteria are a couple hundred nanometers.

The challenge for researchers was to develop a filter medium with pores large enough to pass water molecules but small enough to trap and block bacteria.

The new block copolymer material has evenly spaced pores about 55 nanometers in diameter, perfect for the task, researchers say.

"These materials present new opportunities for use as filtration membranes," Javid Rzayev, UB assistant professor of chemistry, says.

"Commercial membranes have limitations as far as pore density or uniformity of the pore size. The membranes prepared from block copolymers have a very dense distribution of pores, and the pores are uniform.

"Making pores bigger increases the flow of water, which will translate into cost and time savings," he said. "At the same time, 50 to 100 nanometer diameter pores are small enough not to allow any bacteria through. So, that is a sweet spot for this kind of application."