How cholera-causing bacteria respond to pressure

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Cholera remains common in non-industrialized parts of the world today. It persists in part because *V. cholera*, the bacteria that causes the disease, is able to survive in diverse environments ranging from the intestinal lumen, to fresh water, to estuaries, to the sea. A study in *The Journal of General Physiology* provides new insights about the membrane components of *V. cholera* that enable it to withstand otherwise deadly increases in osmotic pressure resulting from changes in its surrounding environment.

Like other bacteria, *V. cholera* utilizes mechanosensitive channels to respond to rapid shifts in the external osmolarity. But the specific details of how it does so are unclear.

Now, researchers from the University of Maryland utilize techniques previously used on *E. coli* to analyze the functional properties of *V. cholera*. Sergei Sukharev and colleagues performed the first patch-clamp analysis of channels in the plasma membrane of *V. cholera* and compared them with those in *E. coli*.

They found that the gating and conductive properties of *V. cholerae* channels were comparable to those of their *E. coli* counterparts. A further comparison of the responses of channels in the two species indicated that, whereas small-conductance MscS-like channels were less dense in *V. cholerae* than in *E. coli*, large conductance MscL-type channels were present at higher density. Surprisingly, however, *V. cholerae* was more sensitive than *E. coli* to abrupt decreases in

osmolarity.

The findings suggest that the increased number of MscL channels might help compensate for other traits rendering *V. cholerae* vulnerable to osmotic shock.

More information: Rowe, I., et al. 2013. J. Gen. Physiol. doi:10.1083/jgp.201310985 Adler, E.M. 2013 *J. Gen. Physiol.* doi:10.1083/jgp.201311041

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