Optimizing sea urchin research

It is now widely accepted that the 3R principles of replacement, reduction, and refinement alternatives should be implemented whenever possible, but is it true for all the organisms used in the labs? Sea urchins are a very useful model organism to study biology and development or the effects of pollution on biological parameters; they are also an important socio-economical resource and efforts should be made to reduce the sampling of natural populations.

In a new Comment, Estefania Paredes and Damian Costas from the ECIMAT describe a new, simple method to differentiate sea urchins by sex in a non-lethal way and without triggering spawning, which allowed them to reduce the number of sea urchins used in the lab.
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But is it 'essential'?

Knock out a gene in a developing pup and that mouse might not make it to weaning. It's tempting to call such genes essential for the viability of the animal, but a note of caution about drawing conclusions from a single study: knock that gene out in a different mouse strain and an entirely different, entirely viable phenotype just might be the result.

Knowing your model and how to interpret the results you see in it matters, for the mice as well as whatever human disease they might be intended to model. In a series of Comment articles—starting with a discussion this month of 'essential' mouse genes—we'll consider some of the often overlooked variables that can make big differences in phenotypic outcomes in animal models.
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