

# New study refutes existence and clinical potential of very small embryonic-like stem cells

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Scientists have reported that very small embryonic-like stem cells (VSELs), which can be isolated from blood or bone marrow rather than embryos, could represent an alternative to mouse and human embryonic stem cells for research and medicine. But their very existence is hotly debated, and a study appearing online on July 24th in the ISSCR's journal *Stem Cell Reports*, published by Cell Press, provides strong evidence against the existence of VSELs capable of turning into different cell types. The findings call into question current plans to launch a clinical trial aimed at testing whether VSELs can be used for regenerative medicine in humans.

"To know when a stem cell discovery is true, it must meet several criteria," says senior study author Irving Weissman of Stanford University School of Medicine. "First, the work must be published in a peer-reviewed journal; second, other labs in the field should be able to repeat the findings; third, the phenomenon should be so robust that other experimental methods must reveal it; and fourth, in the stem cell field, the regeneration that occurs must be rapid, robust, and lifelong. In our study, we did not find evidence supporting the second, third, and fourth requirements."

In 2006, a group of researchers first reported the presence of VSELs in mice. Subsequent studies have provided evidence that these cells also exist in [human blood](#) and bone marrow and could turn into specialized cells such as [lung cells](#), a finding which may be useful for replacing damaged tissue. But other labs have failed to replicate these findings. Nonetheless, a [biopharmaceutical company](#) called Neostem, which acquired the exclusive license to VSEL technology, plans to apply for Food and Drug Administration approval to carry out a first-in-man trial to test whether VSELs

can regenerate bone. In light of these conflicting results, Weissman and his team made the most rigorous effort yet to replicate the original VSEL findings. Although they used a variety of protocols, they failed to find VSELs derived from mouse bone marrow that could turn into specialized blood cells. Instead, the "VSELs" appeared to be artifacts such as cell debris and fragments from dying cells. "Our findings clearly refute the basis in mouse studies that VSELs have the potentials claimed, and therefore call into question claims that these cells have potential for clinical application in humans," Weissman says.

Another article that will be published on the same day in the journal *Cell Stem Cell* reviews the controversy surrounding VSELs and includes wide-ranging commentary from experts in the field.

**More information:** *Cell Stem Cell* [Doi: 10.1016/j.stemcr.2013.07.001](https://doi.org/10.1016/j.stemcr.2013.07.001)

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