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Comment on “ ‘Stemness’: Transcriptional Profiling of Embryonic and Adult Stem Cells” and “A Stem Cell Molecular Signature” (II)

Two recent reports (1, 2) have compared transcription profiles of mouse embryonic stem cells (ESCs), neural stem cells (NSCs), and hematopoietic stem cells (HSCs). Both identified a set of genes common to all three types of stem cells and proposed that these genes “reveal core stem cell properties (or ‘stemness’)” (1) or “define a common SC [stem cell] genetic program or SC molecular signature” (2). We thought that it would be worthwhile to compare the stem cell essential gene sets as reported in the two papers and to determine how many of the 230 stem cell genes listed by Ramalho-Santos *et al.* (1) can be found among the 283 stem cell genes listed by Ivanova *et al.* (2). For this, we compared the lists of Affymetrix IDs given for every gene in both lists. To our consider-

able surprise, only six genes can be found in both sets (1.2% overlap). Moreover, when we compared the 230 stem cell genes listed by Ramalho-Santos *et al.* (1) with the 899 genes expressed in at least two of the three stem cell types presented by Ivanova *et al.* (2), only 17 common genes may be found (1.5% overlap).

Considering the virtual identity of experimental material and methods used in the two reports, this degree of overlap hardly justifies the ambitious statements cited above. It seems that “stemness” genes are elusive and cannot be readily identified by the approaches presented in these two papers. It has been suggested (3) that “important differences in methodology” could explain the almost total lack of overlap—namely, that Ivanova *et al.*

(2) probed the entire Affymetrix U74 set (36,000 mouse genes and EST clusters), whereas Ramalho-Santos *et al.* (1) probed only U74A (12,000 genes and EST clusters). This difference cannot be used as an explanation, however, because logically, Ivanova *et al.* should have found every gene and EST that Ramalho-Santos *et al.* detected and, indeed, many more. In addition, out of the 283 “stemness” genes listed by Ivanova *et al.*, 82 are present on the U74A array and should all have been found by Ramalho-Santos *et al.*; instead, they found only six.

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References and Notes

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3. C. E. Burns and L. I. Zon, *Dev. Cell* **3**, 612 (2002).
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