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Generating robustness

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Gene knockouts often fail to reveal phenotypes, suggesting that biological systems are laden with compensation mechanisms, which might involve functional redundancy between duplicated genes or between alternative pathways and networks. In the January 2 *Nature* Gu *et al.* describe a genome-wide evaluation of genetic robustness against null mutation (*Nature* 2003, **421**:63-66). Analysis of fitness measurements for nearly all single-gene [deletion mutants](#) in the yeast *Saccharomyces cerevisiae* showed that duplicate genes were less often associated with lethal phenotypes. Deletion of duplicate genes had similar fitness effects. Gu *et al.* found evidence for a correlation between the sequence similarity of the duplicates and the frequency of compensation. Furthermore, deleting the gene copy that is most highly expressed had the greatest effect on fitness. Functional compensation between duplicate genes may account for a quarter of gene deletions that lack phenotypes.

References

1. *Nature*, [<http://www.nature.com>]
2. Systematic screen for human disease genes in yeast.