

1 **Supporting Information (SI)**

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3 **Multi-enzyme pyruvate removal system to enhance**
4 **(*R*)-selective reductive amination of ketone**

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1 **Table S1.** Sequences of the primers used in this study

Name	Sequence (5'-3')
ArR-ωTA-F	CATATGGCTTTCTCTGCTGACACCTCT
ArR-ωTA-R	AATACTAGTTAGTACTGAACCGGGGTC
LDH-F	GGAATTCCATATGATGAAACTCGC
LDH-R	ACTAGTTTAAACCAGTTCGTTTCGGG
GDH-F	GGAATTCCATATGCATCACCATCATCACCCTACCCGGAC
GDH-R	GGACTAGTTTACCACGACCAGCCT
Ybiw-F	GGAATTCCATATGCATCACCATCATCACCACACCACACTGAAACTG
Ybiw-R	GGACTAGTTTACAGCATATGTTTCAGTACGG
PflB-F	GGAATTCCATATGCATCACCATCATCACCACATCCGAGCTTA
PflB-R	GGACTAGTTACATAGATTGAGTGAAGG
PflD-F	GGAATTCCATATGCATCACCATCATCACCACACGAATCGTATCTC
PflD-R	GGACTAGTTACAGCTGATGCGCT
TdcE-F	GGAATTCCATATGCATCACCATCATCACCACAAGGTAGATATTGA
TdcE-R	GGACTAGTTCAGAGCGCCTGGGTAA

1 **Table S2.** Synthesized gene sequences in this study

Genes	Sequences
<i>ArR-</i>	CATATGGCTTTCTCTGCTGACACCTCTGAAATCGTTTACACCCACGACACCGGTCTGGACTACATCACC
<i>ωTA</i>	TACTCTGACTACGAACTGGACCCGGCTAACCCGCTGGCTGGTGGTGTCTGCTTGGATCGAAGGTGCTTT CGTTCGCCGCTCTGAAGCTCGTATCTCTATCTTCGACCAGGGTTACCTGCACTCTGACGTTACCTACAC CGTTTTCCACGTTTGGAACGGTAACGCTTCCGCTCTGGACGACCACATCGAACGCTCTGTTCTCTAACGC TGAATCTATGCGTATCATCCCGCCGCTGACCCAGGACGAAGTTAAAGAAATCGCTCTGGAACTGGTTG CTAAAACCGAACTGCGTGAAGCGTTTGTATCTGTAAGCATCACCCGTGGTTACTCTTCTACCCCGGGTG AACGTGACATCACAAACACCGTCCGCAGGTTTACATGTACGCTGTTCCGTACCAGTGGATCGTTCCG TTCGACCGTATCCGTGACGGTGTTCACGCTATGGTTGCTCAGTCTGTTTCGTCGTACCCCGCGTTCTTCTA TCGACCCGCAGGTTAAAACTTCCAGTGGGGTGACCTGATCCGTGCTGTTTCAGGAAACCCACGACAGG GGCTTCGAAGCTCCGCTCCTGCTGGACGGTGACGGTCTGCTGGCTGAAGGTTCTGGTTTCAACGTTGTT GTTATCAAAGACGGTGTGTTCGTTCTCCGGGTCGTGCTGCTCTGCCGGGTATCACCCGTAAAACCGTT CTGGAAATCGCTGAATCTCTGGGTCACGAAGCTATCCTGGCTGACATCACCCCTGGCTGAACTGCTGGA CGCTGACGAAGTTCTGGGTTGCACCACAGCTGGCGGTGTCTGGCCGTTTCGTCTCTGTTGACGGTAACCC GATCTCTGACGGTGTTCGGGTTCCGGTTACCCAGTCTATCATCCGTCGTTACTGGGAACTGAACGTTGA ATCTTCTTCTCTGCTGACCCCGGTTTCAGTACTAACTAGTATTCAAGCTT
<i>gfp</i>	ATGCGTAAAGGAGAAGAAGCTTTTCACTGGAGTTGTCCCAATCTTGTGTAATTAGATGGTGATGTTAAT GGGCACAAATTTTCTGTCAGTGGAGAGGGTGAAGGTGATGCAACATACGGAAAAGTACCCTTAAATT TATTTGCACTACTGGAAAAGTACCTGTTCCGTGGCCAACACTTGTCACTACTTTCGGTTATGGTGTTCA ATGCTTTGCGAGATACCCAGATCACATGAAACAGCATGACTTTTTCAAGAGTGCCATGCCCGAAGGTT ATGTACAGGAAAGAAGTATATTTTTCAAAGATGACGGGAACTACAAGACACGTGCTGAAGTCAAGTTT GAAGGTGATACCCTTGTTAATAGAATCGAGTTAAAAGGTATTGATTTTAAAGAAGATGGAAACATTCT TGGACACAAATTGGAATACAAGTATAACTCACACAATGTATACATCATGGCAGACAAAACAAAAGAAT GGAATCAAAGTTAACTTCAAATTAGACACAACATTGAAGATGGAAGCGTTCAACTAGCAGACCATT ATCAACAAAATACTCCAATTGGCGATGGCCCTGTCCTTTTACCAGACAACCATTACCTGTCCACACAAT CTGCCCTTTTCGAAAGATCCCAACGAAAAGAGAGACCACATGGTTCCTTCTTGAGTTTGTAAACAGCTGCT GGGATTACACATGGCATGGATGAACTATACAAATAATAA

ldh

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gdh

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TCC

ybiw

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pflB

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1 **Table S3.** GC analyses of substrates and products.

Substrate	Retention time [min]	Product	Retention time [min]
2-pentanone	4.5	pentan-2-amine	4.3
4-phenyl-2-butanone	16.1	4-phenylbutan-2-amine	21.6
cyclohexanone	7.1	cyclohexylamine	8.5

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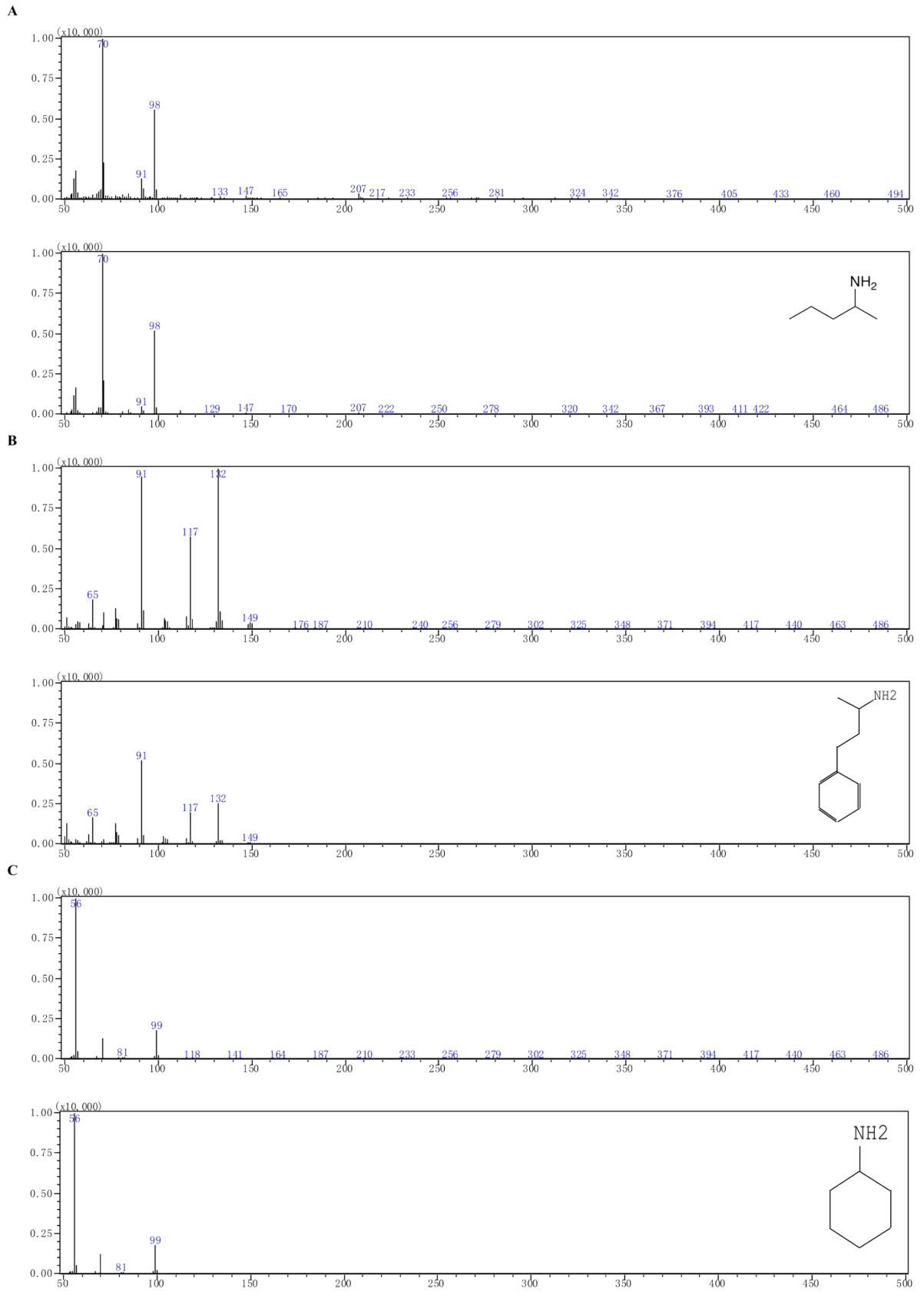
3

1 **Table S4.** Chiral analyses of the products.

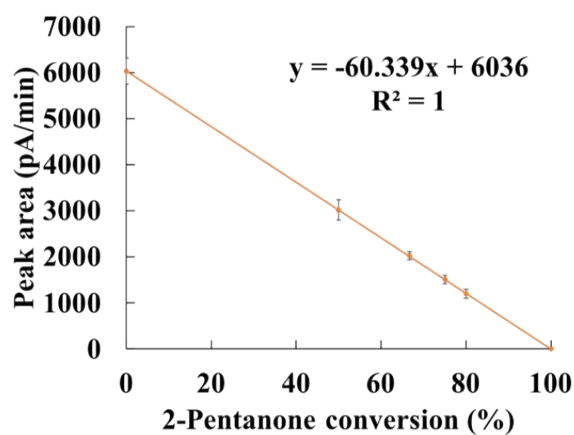
Product	Retention time [min] (<i>S</i>)	Retention time [min] (<i>R</i>)
Pentan-2-amine	9.4	9.6
4-phenylbutan-2-amine	34.5	34.9

2

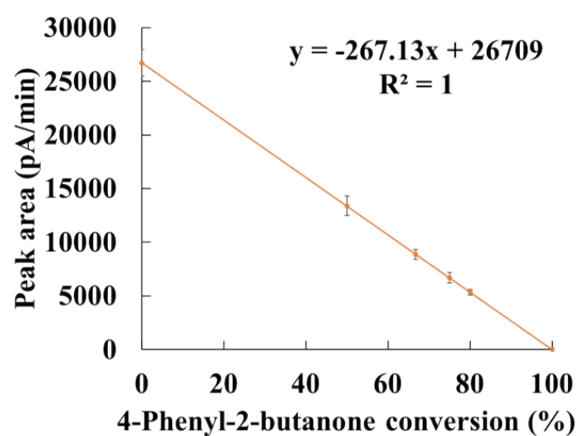
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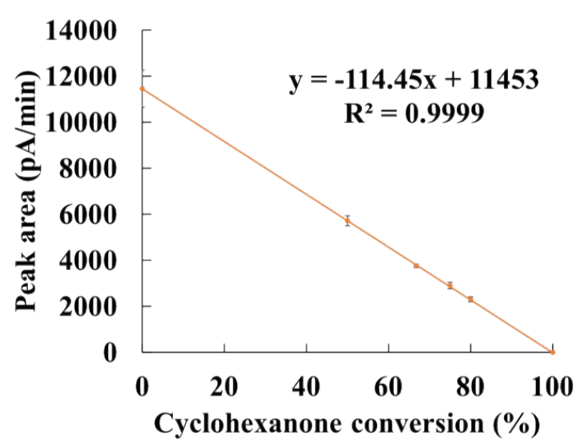
A



B



C

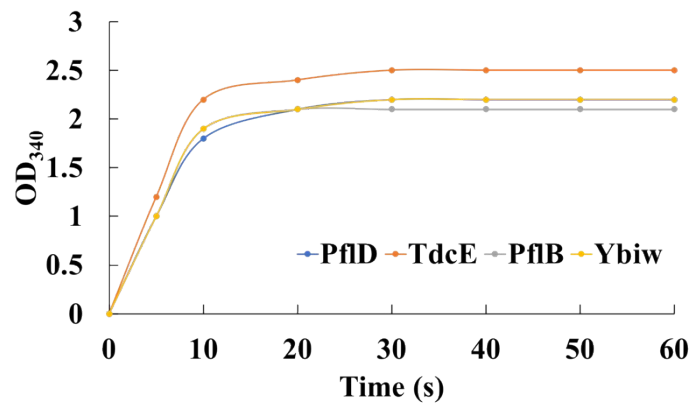


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2 **Figure S2.** The standard curves of substrates. (A-C) The standard curves of 2-
3 pentanone, 4-phenyl-2-butanone and cyclohexanone, respectively. Results are
4 represented as mean \pm SD of three replicates.

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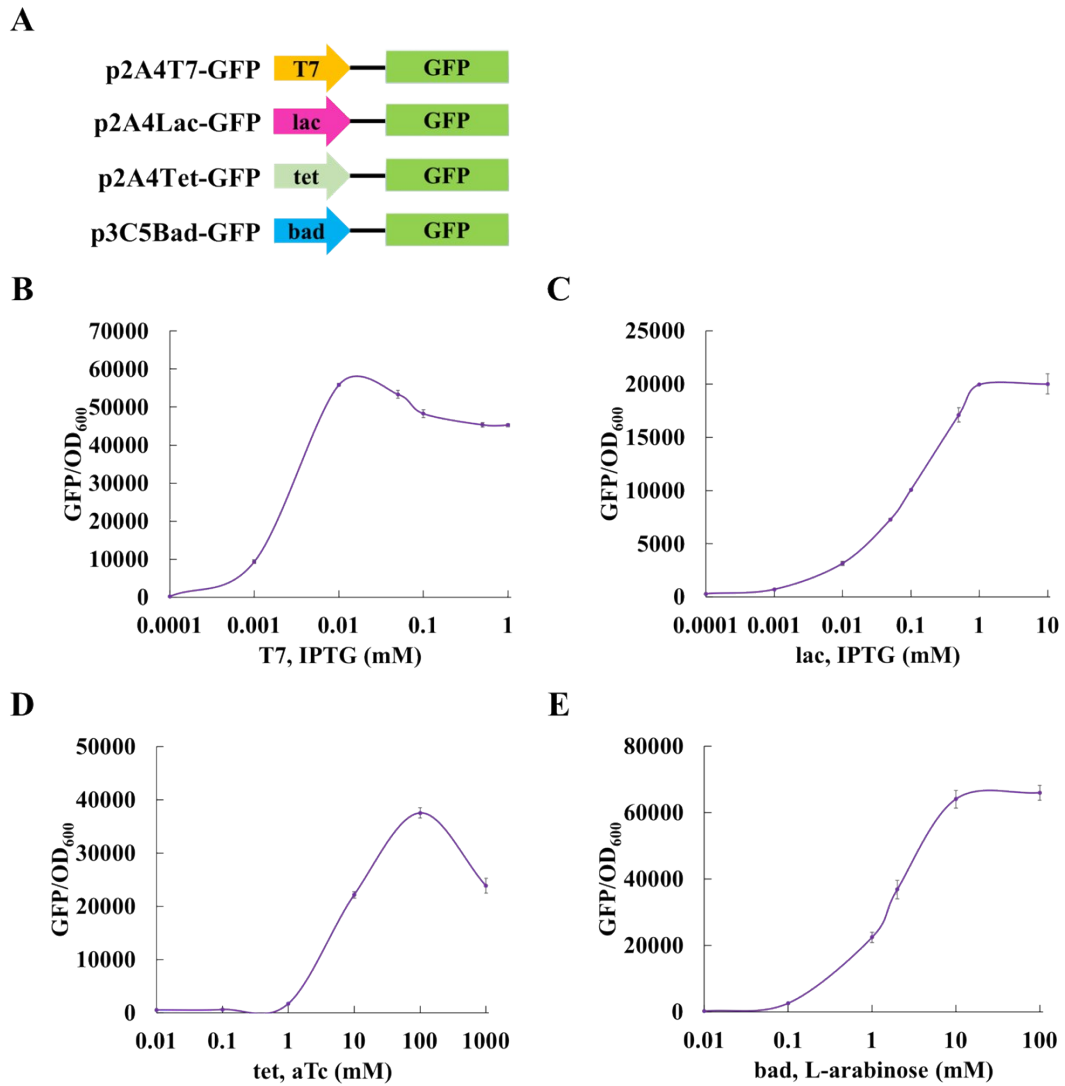
2

3 **Figure S3.** The profiles of OD₃₄₀ versus time.

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2 **Figure S4.** Expression of GFP with different promoters in *E. coli*. (A) Schematic diagram of
 3 plasmids used for GFP expression. (B-E) GFP/OD₆₀₀ results from cultures of *E. coli* containing
 4 indicated promoters with inducing the expression of GFP at 25°C for 16 h. Results are
 5 represented by the mean values of three replicates and the error bar by the standard deviation.

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