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Pro	Ala	Lys	Pro	Leu	Ser	Asp	Ser	Lys	Leu	Thr	Ser	Leu	Leu	Ser	Glu
		435					440					445			
Gln	Gly	Ile	Met	Val	Ala	Arg	Arg	Thr	Val	Ala	Lys	Tyr	Arg	Glu	Ser
	450					455					460				
Leu	Ser	Ile	Pro	Pro	Ser	Asn	Gln	Arg	Lys	Gln	Leu	Val			
465					470				475						

What is claimed is:

1. A system comprising a BmoR transcription factor, a σ^{54} -RNA polymerase, and a pBMO promoter operatively linked to a reporter gene, wherein the pBMO promoter is capable of expression of the reporter gene with an activated form of the BmoR and the σ^{54} -RNA polymerase.

2. The system of claim **1** comprising (a) a first nucleic acid encoding the BmoR, and (b) a second nucleic acid, or optionally the first nucleic acid, encoding a pBMO promoter operatively linked to a reporter gene; wherein the system is capable of expressing the σ^{54} -RNA polymerase and the pBMO promoter is capable of expression of the reporter gene.

3. The system of claim **2**, wherein the pBMO promoter encodes a nucleotide sequence comprising a nucleotide sequence depicted by SEQ ID NO:5-16.

4. The system of claim **1**, wherein the BmoR is capable of sensing a C₂-C₈ alcohol.

5. The system of claim **4**, wherein the BmoR is capable of sensing butan-1-ol, 1-propanol, 2-propanol, 1-pentanol, 1-hexanol, or ethanol.

6. A modified host cell comprising a first nucleic acid encoding a BmoR¹, and a second nucleic acid encoding a pBMO promoter operatively linked to a reporter gene, wherein the modified host cell is capable of expressing a σ^{54} -RNA polymerase.

7. The modified host cell of claim **6**, wherein the gene product of the reporter gene increases or decreases the doubling time of the modified host cell in a particular environment.

8. The modified host cell of claim **6**, wherein the gene product of the reporter gene causes the modified host cell to become resistant or sensitive to a compound.

9. The modified host cell of claim **6**, wherein the BmoR is capable of sensing a C₂-C₈ alcohol.

10. The modified host cell of claim **9**, wherein the BmoR is capable of sensing butan-1-ol, 1-propanol, 2-propanol, 1-pentanol, 1-hexanol, or ethanol.

11. The modified host cell of claim **6**, wherein the pBMO promoter encodes a nucleotide sequence comprising a nucleotide sequence depicted by SEQ ID NO:5-16.

12. A method for sensing a C₂-C₈ alcohol, aldehyde, or mixture thereof, comprising: (a) providing a modified host cell comprises a first nucleic acid encoding a BmoR transcription factor, and a second nucleic acid encoding a pBMO promoter operatively linked to a reporter gene, wherein the modified host cell is capable of expressing a σ^{54} -RNA polymerase and the pBMO promoter is capable of expression of the reporter gene, and (b) detecting the expression of the reporter gene.

13. The method of claim **12**, wherein the (b) detecting step comprises detecting the gene product of the reporter gene.

14. The method of claim **13**, wherein the gene product of the reporter gene increases or decreases the doubling time of the modified host cell.

15. The method of claim **13**, wherein the gene product of the reporter gene causes the modified host cell to become resistant or sensitive to a compound.

16. The method of claim **12**, wherein the BmoR is capable of sensing a C₂-C₈ alcohol.

17. The method of claim **16**, wherein the BmoR is capable of sensing butan-1-ol, 1-propanol, 2-propanol, 1-pentanol, 1-hexanol, or ethanol.

18. The method of claim **12**, wherein the pBMO promoter encodes a nucleotide sequence comprising a nucleotide sequence depicted by SEQ ID NO:5-16.

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