

Supporting Information

Investigation into antifreeze performances of natural amino acids for novel CPA development

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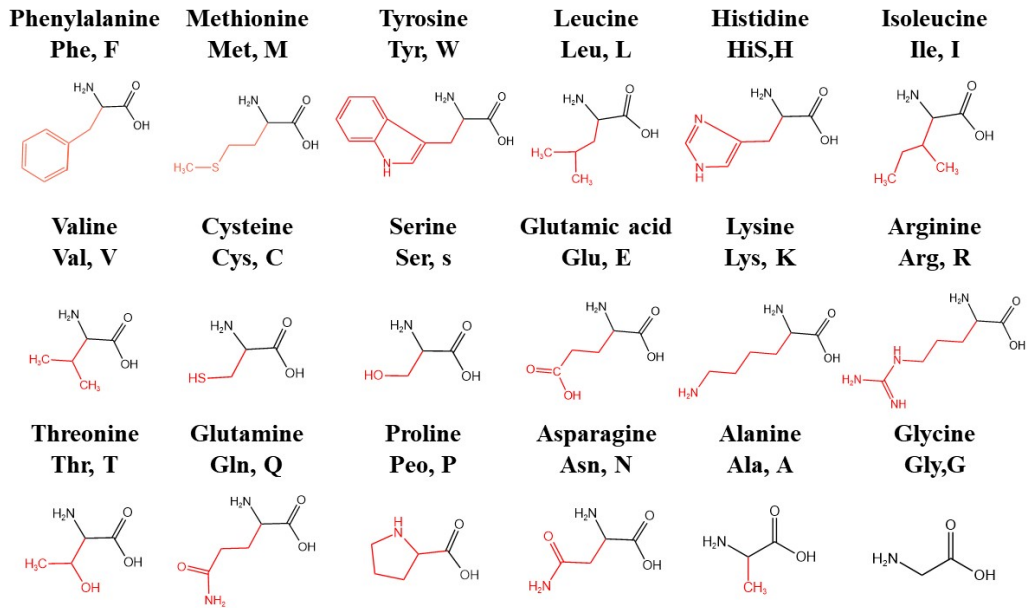


Figure S1. 18 amino acid structures.

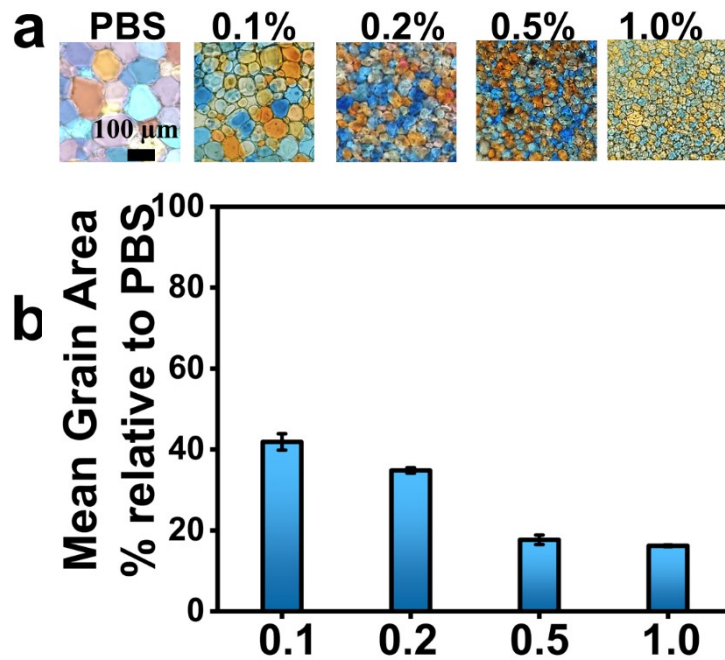


Figure S2. Antifreeze function of different concentrations of phenylalanine. a) Images of ice crystals with different concentrations of F. b) Ice recrystallization inhibition activity of amino acids. Error bars are ± 1 SD from a minimum of three repeats. The mean grain area relative to PBS.

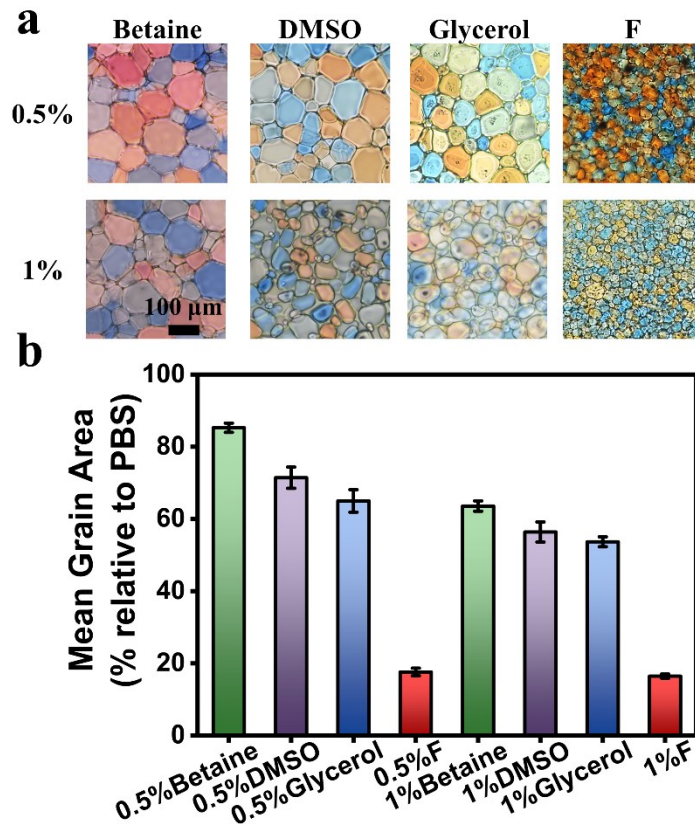


Figure S3. Antifreeze function of different concentrations of Betaine, DMSO, Glycerol.
a) The images of ice crystals. b) Ice recrystallization inhibition activity of simples. Error bars are ± 1 SD from a minimum of three repeats. The mean grain area relative to PBS.

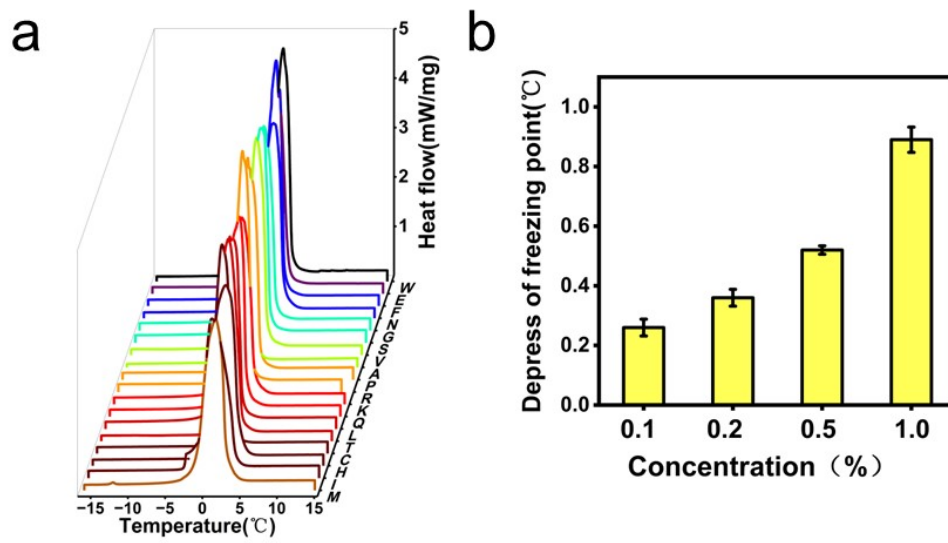


Figure S4. DSC test. a) Differential scanning calorimetry (DSC) melting thermograms of amino acids. b) The ability to depress the freeze point with different concentrations of M.

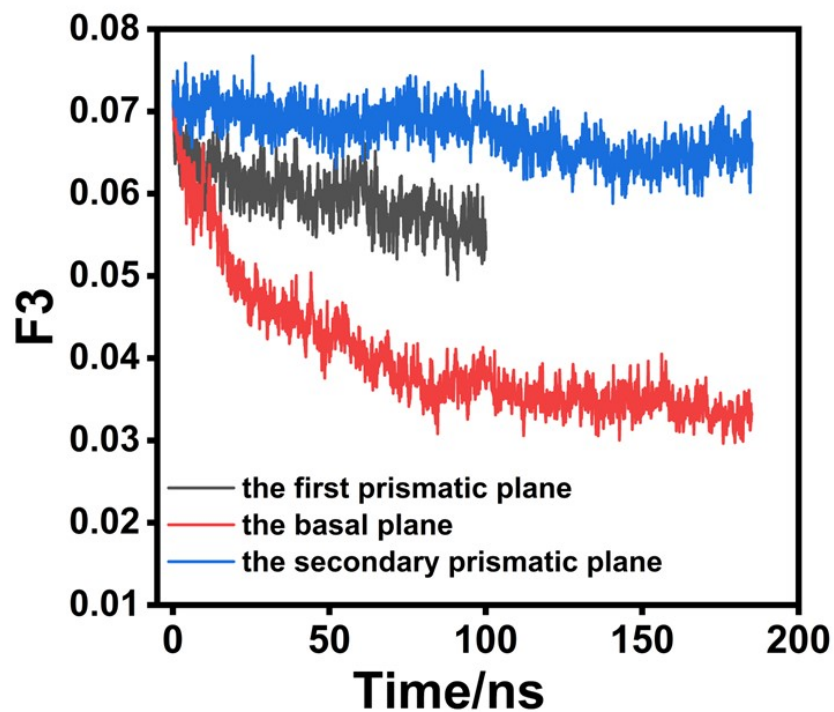


Figure S5. The F3 values during simulations in phenylalanine (F) solution.

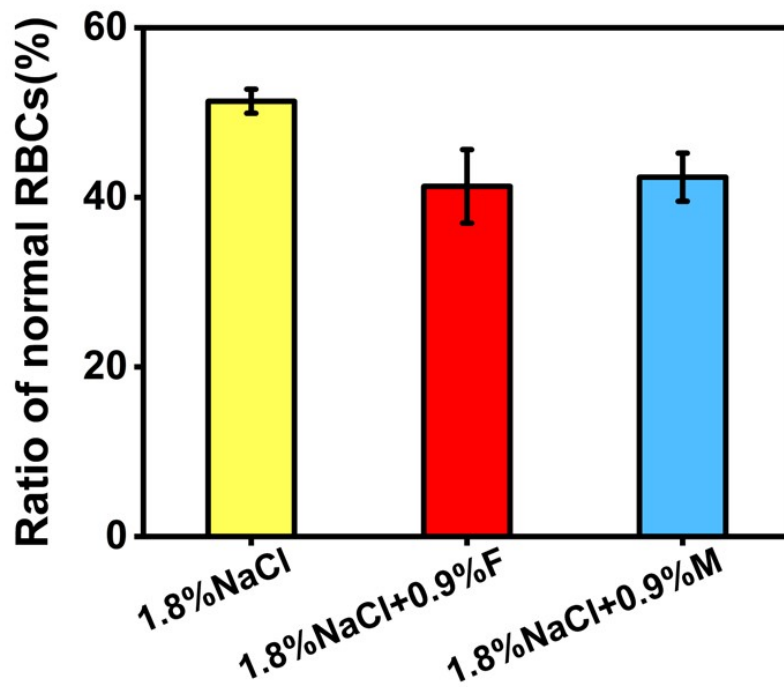


Figure S6. The RBCs' integrity after incubation.

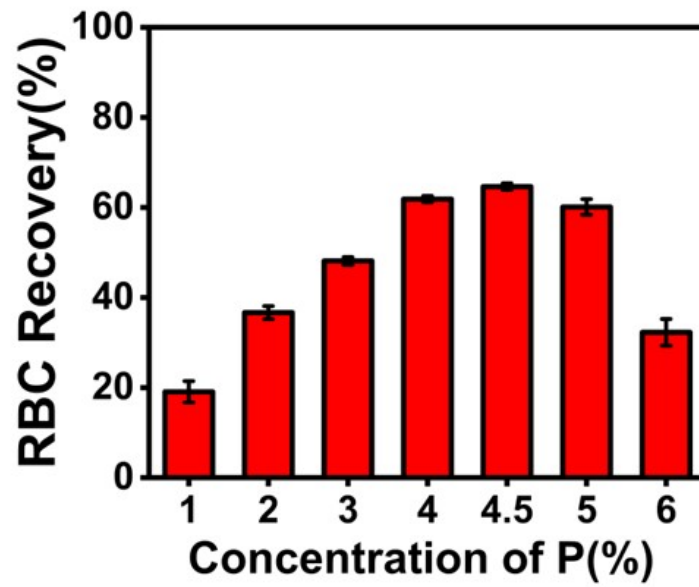


Figure S7. The RBCs recovery in different concentration of P solution.

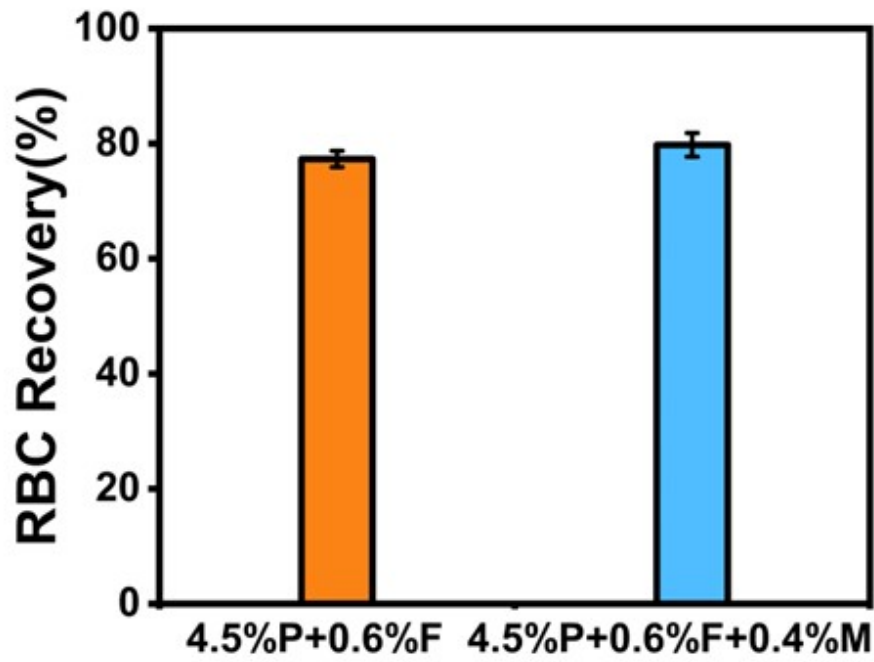


Figure S8. The RBCs recovery in different amino acids-based CPAs.

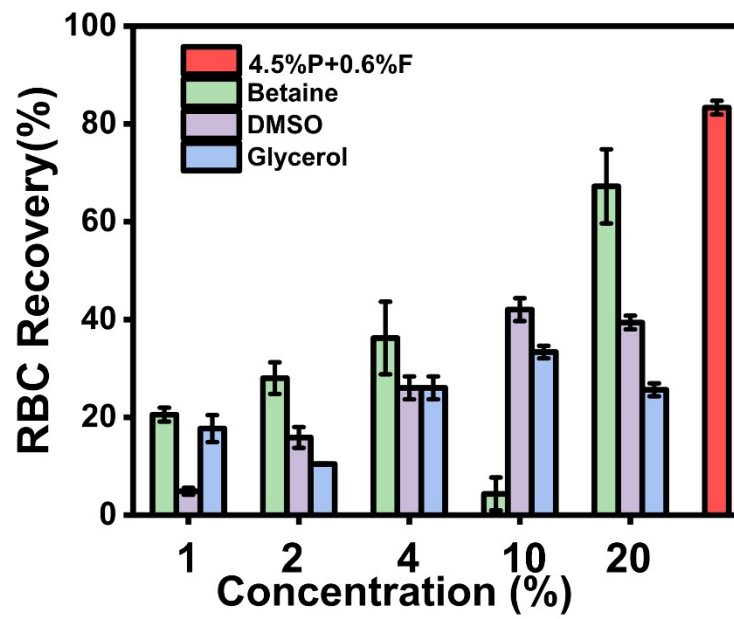


Figure S9. The RBCs recovery in different CPAs.

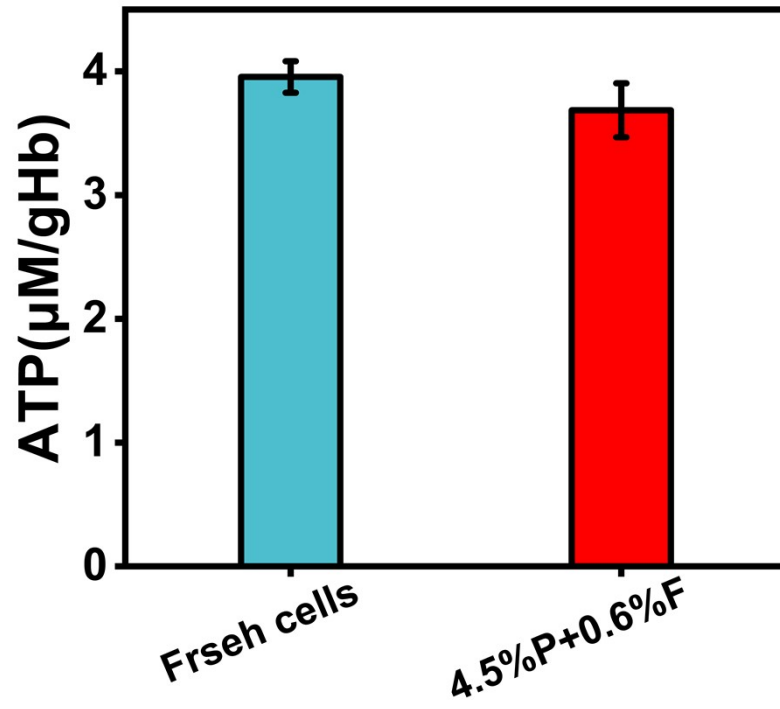


Figure S10. The ATP concentration of RBCs after cryopreservation.