

# Nature's Guide to Organ Preservation: The Application of *Chrysemys picta* Brumation Techniques To Extend the Preservation Period of Organs

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There are currently over 103,000 people on the national transplant waiting list. The kidney has the longest waiting list. Once patients are approved for this treatment there are still many roadblocks they must encounter. These roadblocks include: being able to cool the organ without it deteriorating, preserving the organ long enough to be transported and to have the patient prepared for surgery, and heating the organ backup without risking deterioration. Typically organs are only viable outside of the body for 2 to 48 hours depending on which organ it is. If a technology was created to increase the time an organ can be preserved, lives would be saved. The circumstances of *Chrysemys picta* (painted turtle) brumation were observed in order to find solutions. During cold weather, *C. picta* enters a state of brumation in the muddy bottom of a pond or lake. Brumation is reptilian hibernation which includes the organism slowing its metabolism and becoming lethargic. Due to its environment, *C. picta* experiences increased pressure and is surrounded by cold thick mud. During this experiment, techniques of organ preservation inspired by *C. picta* were compared to traditional organ preservation methods like that of a Lifeport Kidney machine. *E. coli* was used to model a kidney and was placed in 3 different variables in two trials which had 3 controls. The growth of *E. coli* was measured over 4/6 days, a new set of colonies were put under hypothermia for 52 (trial 1) and 24 hours (trial 2), then their growth after incubation was compared to the first growth period. The results support using increased air pressure and a thick cold substrate as a more effective way of preserving organs. This experiment can lead to new techniques of organ preservation to provide accessibility to organs.