

## ABSTRACT

### THE EFFECTS OF HIGH HYDROSTATIC PRESSURES ON NADH CONFORMATION

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Reduced nicotinamide adenine dinucleotide (NADH) plays a central role in cellular metabolism via a redox reaction. Its conformation is physiologically significant as NADH takes a folded conformation when free and an unfolded conformation when protein bound. This study uses fluorescent emission spectroscopy and solvent denaturation to examine pressure's role in the equilibrium conformation of NADH in solution (10 and 20  $\mu\text{M}$  in MOPS buffer, pH 7.4). Quartz capillary-based high-pressure chambers house samples up to 51 MPa which are excited with a 337 nm nitrogen laser. Using a two-state model, the free energy of unfolding is determined and the volume change of unfolding is measured to be 24.9 ml/mol assuming an Arrhenius relationship. The validities of the two-state model and the selected concentration range are assessed. Results are significant to understanding pressure effects on cellular metabolism and for future studies probing the fluorescent signals of cells under pressure.