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Enzymatic and Energetic Properties of the Aerobic Respiratory Chain-linked NADH Oxidase System in the Marine Bacterium *Vibrio natriegens*

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Membranes prepared from *Vibrio natriegens* oxidized both NADH and deamino-NADH as substrates. The maximum activity of the membrane-bound NADH oxidase was obtained at about pH 8.5 in the presence of 0.2 M NaCl, while that of the NADH:quinone oxidoreductase was obtained at about pH 7.5 in the presence of 0.2 M NaCl. Electron transfer from NADH or deamino-NADH to ubiquinone-1 or oxygen generated a considerable membrane potential (Ψ), which occurred even in the presence of 20 M carbonylcyanide *m*-chlorophenylhydrazone (CCCP). The Ψ was completely collapsed by the combined addition of 10 M CCCP and 20 M monensin, however. On the other hand, the activity of the NADH oxidase and the Ψ generated by the NADH oxidase system were inhibited by about 90% with 10 M HQNO, whereas the activity of the NADH:quinone oxidoreductase and the Ψ generated at the NADH:quinone oxidoreductase segment were inhibited by about 60%. Interestingly, the activity of the NADH:quinone oxidoreductase and the Ψ generated at the NADH:quinone oxidoreductase segment were resistant to the respiratory chain inhibitors such as rotenone, capsaicin, and $AgNO_3$, and the activity of the NADH oxidase and the Ψ generated by the NADH oxidase system were very sensitive only to $AgNO_3$.