

Significance of translocation of coenzyme Q10 to mitochondria in its whitening and anti-aging effects

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Coenzyme Q (CoQ) is a well-known electron transporter in the mitochondrial respiratory chain. Furthermore, ubiquinol (UQH₂)—a reduced form of ubiquinone (UQ)—has been shown to act as a radical-scavenging antioxidant. Some studies have reported the beneficial effect of CoQ addition to cultured cells; however, the cellular uptake and distribution of CoQ have not been elucidated. Our recent study suggests that the added UQ10 as well as UQ10H₂ mainly localized in the mitochondrial fraction, which is similar to the localization of endogenous CoQ but different from that of α T. These results suggest a certain system which accumulates CoQ preferentially in mitochondria. Benzoquinone ring of CoQ suggests a redox function, while the isoprenic side chain mediates the arrangement of CoQ in the lipid core of biomembranes; however, detail molecular mechanisms of accumulating system of CoQ in mitochondria are still unknown. In the present study, we examined the cellular distribution of CoQ with different isoprenic side chain. At first, we developed the measurement system of short chain homolog of CoQ using HPLC system. Now we examined the cellular uptake and distribution of short chain homolog of CoQ.