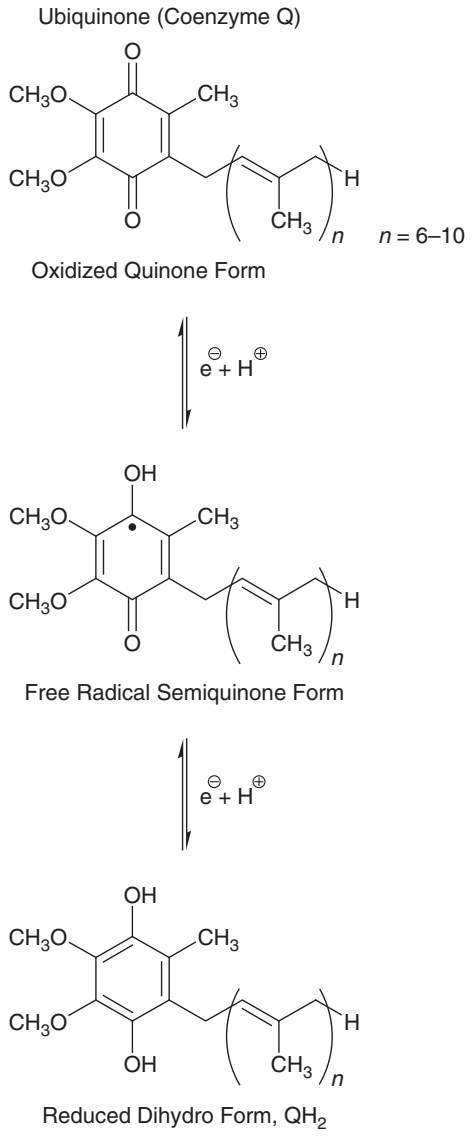

Figure 11-2 Forms of coenzyme Q (ubiquinone), showing the one-electron transfers in going from the oxidized quinone form, through the semiquinone radical, to the reduced dihydroquinone.

The cytochrome *a* family (abbreviated cyt *a*) noncovalently, but tightly, binds its heme group; an example of this type of cytochrome is found in the structure of the enzyme cytochrome *c* oxidase. (Somewhat confusingly, this enzyme contains subunits of the cytochrome *a* family, but its substrate is a cytochrome *c* protein.) Subscripts on the letter denote different members of the protein family (e.g., cyt *a* and cyt a_3).

The *b* family of cytochromes (cyt *b*) have the same heme as in the oxygen transporter protein hemoglobin. These cytochromes perform various functions: They are electron carriers in several systems. Like the cytochrome *a* proteins, the cytochrome *b* proteins also hold their heme groups noncovalently but tightly.

The *c* family of cytochromes (cyt *c*) differ here in that they form a covalent linkage to their heme group. Members of this family are ubiquitous one-electron transfer agents involved in many different systems.

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