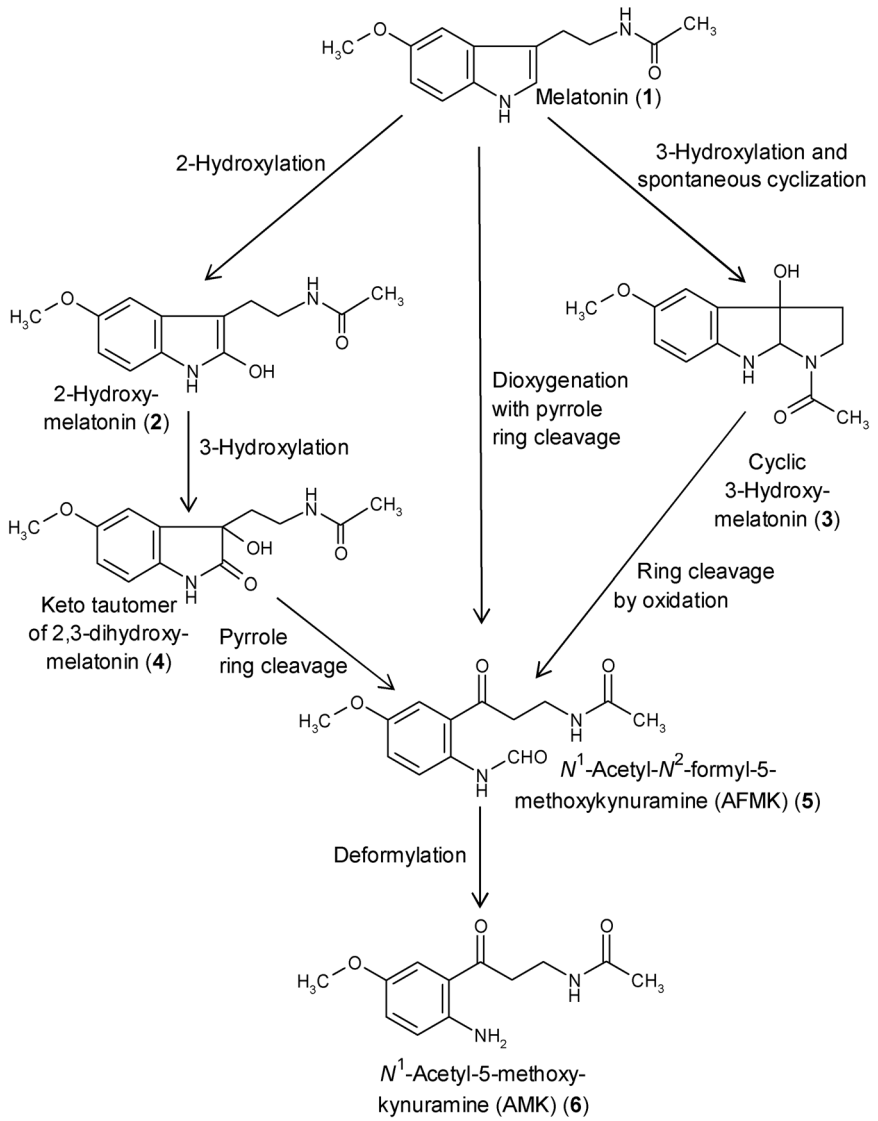

Figure 19.1 Melatonin (**1**) and formation of its protective kynuramine metabolites, AFMK (**5**) and AMK (**6**). Hydroxylations (compounds **1** → **2**, **1** → **3**, **2** → **4**) and oxidative cleavage of **3** → **5** occur under the influence of electron/hydrogen-abstracting free radicals, such as •OH. Pyrrole ring cleavage of **4** → **5** represents a spontaneous rearrangement. Dioxygenation of **1** → **5** is possible by various mechanisms, including enzymatic, pseudo-enzymatic, free-radical, singlet-oxygen and photochemical reactions. Deformylation of **5** → **6** occurs in enzymatic or photochemical reactions. For details see ref. 106 and 107.