Major Albumin-Associated Fluorescent Substance in Uremic Serum

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Dear Sir,

The accumulation of endogenous fluorescent substances in uremic sera is well documented [for example, see ref. 1], but the nature and the origin of these substances are conflicting. It is important to distinguish the nondialyzable albumin-associated fluorescent substances from the dialyzable fluorescent substances which are found in dialysate or hemofiltrate [2]. The albumin-associated fluorescent substances are thought to be a source of the analytical error in the electrophoretic analysis of creatine kinase in uremic patients [3, 4].

In addition, these fluorescent substances may be drug-binding inhibitors retained in uremic serum [5, 6]. Schwertner [6, 7] has isolated the albumin-associated fluorescent ligands which have an emission maximum of 415 ± 5 nm. Lichtenwalner et al. [8] have reported that 2-hydroxybenzoylglycine is a drug-binding inhibitor in uremic serum and it has a fluorescent emission maximum of 425 nm. However, Suh et al. [9] have recently reported that the serum concentrations of 2-hydroxybenzoylglycine are only below 0.006 mM in uremia.

We have recently demonstrated that a major endogenous ligand retained in uremic serum is 3-carboxy-4-methyl-5-propyl-2-furanpropanoic acid (CMPF) and it inhibits the binding of phenytoin to plasma protein [10]. CMPF has a strong affinity for serum albumin [manuscript submitted] and its serum concentrations are approximately 0.2 mM in patients with uremia [11]. CMPF is a fluorescent substance as shown in figure 1. The characteristics of its fluorescence are similar to those of the albumin-associated fluorescence reported earlier [5–7]. These findings suggest that CMPF may be a major albumin-associated fluorescent substance in uremia.

![Fluorescence emission spectra of CMPF excited at 350 nm (a) or 400 nm (b).](image)

Most fluorescent substances retained in uremic serum are the dialyzable non-protein-bound forms, and the contribution of CMPF to the whole serum fluorescence in uremia is negligible [12; and our unpublished observations].

References


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329


