

Identification of a Novel 167 kDa Lemon Grass Protein with Anti-Dandruff Properties

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Inclusion of total RNA from lemon grass with β -adrenergic receptor mRNA in an *in vitro* translation reaction resulted in the appearance of five extra protein bands upon SDS-polyacrylamide-gel-electrophoresis. Two of these bands corresponded to novel proteins containing SH2 domains. The remaining three bands were identified as drops of soy sauce on the gel. The larger true band corresponded to a 167 kDa protein from lemon grass. Amino acid sequence analysis revealed 67% homology to the auditory music recognition proteins beethoven, chopin, and vivaldin. Experiments with a new transgenic mouse model for dandruff (Barsh *et al.*, 1994) showed that this protein, which we named lemin, inhibited up to 95% of the usual formation of dandruff. Therapeutic use of lemin will soon move into the clinical trial stage.

Dandruff is a leading cause of heartbreak and unsuccessful dates in the Western hemisphere, and has been linked to depression and the inability to wear dark business suits (Westin, 1990; Kenneltson and Tsien, 1991). Although there has been much effort in the last several years to find a cure, the only treatment that currently shows any promise also results in baldness, and is not expected to be used widely (Jones *et al.*, 1993; Hals and Spencer, 1994). Sheer and Lawston (1992) demonstrated that dandruff in the mouse is linked to a single gene defect at the *tgrin* locus, and a mouse model for dandruff has recently been constructed (Barsh *et al.*, 1994). We show here that a novel protein from lemon grass, lemin, can inhibit up to 95% of the dandruff generated by non-treated control mice.

MATERIALS AND METHODS

Isolation of total lemon grass RNA.

Lemon grass (Safeway, Menlo Park, CA) was washed in 50 mM Tris, pH 8.0, and chopped into small pieces with a cleaver (Chicago Cutlery, Chicago, IL). 5 g of chopped lemon grass was disrupted in a bead-beater, and extracted with phenol, chloroform, and MSG in a ratio of 5:5:1. RNA was purified as described previously (Harrison, 1989).

Entrée. 500 g chicken wing muscle (Tyson) was treated with 10 ml soy sauce, 10 ml oyster sauce, 50 mg MSG, and 20 mg NaCl for 30 min at 21°C. 1 g finely chopped garlic (Safeway) and 5 g lemon grass chopped as described above were heated at 150°C for 2 min and combined with the treated muscle tissue, and the mixture was heated for an additional