

NEW DEVELOPMENTS IN FIBER INITIATION

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Abstract

Total protein was extracted from ovules during the temporal development of cotton fiber initiation and compared by 2-D PAGE. Comparisons were made between two cultivars of cotton (*Gossypium hirsutum* L.), i.e., a "normal" fiber-producing line (DPL 5690) and a fiberless line (SL 1-7-1). In all, 37 protein differences were found, and these were categorized into 5 groups. Only two of the five groups were postulated to be of major importance in fiber development. These two groups were designated V- and D-type proteins: V for varietal differences, which are proteins found at all ages but occurring in only one line; D for developmental differences unique to DPL 5690. Other differences were associated with the fiberless line or believed to be ovule associated proteins. Six V-type proteins have been identified, with five of these specific to the fiberless line. These varietal differences may be atypical proteins, but most are closely associated with other proteins and could easily be a modification occurring in only one line or the result of multiple alleles. Protein V2 was the only V-type protein found in DPL 5690; it was also found to be a major protein in 14 and 21 DPA fiber (DPL 90ne). Unlike V2, the other five V-type proteins were not seen in 2-D PAGE of 14 DPA fiber. Preliminary evidence indicates that V3, V4, and V5 may be associated with the dominant Naked seed trait. Sixteen D-type proteins were identified in which 14 (88%) accumulated postanthesis. Of the 14 proteins, 9 were found at constant levels in the fiberless line. The other 5 proteins were specific to the normal, fiber-producing line but only emerged and demonstrated large increases postanthesis. The data on the 5 proteins indicate that they are involved in early events of fiber development. One protein in particular, D14, appears to be correlated with fiber elongation. The five D-type proteins, i.e., D7, D10, D12, D13, and D14, were not found in any protein profiles of ovule which did not produce fiber. This was true for both the parent plants and for the F3 progeny test. D7 was the only protein of these 5 D-types which could not be found in 14 or 21 DPA fiber. Further analysis (microsequencing) of the V- and D-type proteins will provide clues as to their cellular function. Overall, these data provide a catalogued subset of 37 proteins, potentially important to future studies in fiber developmental physiology.