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Biochemical Differences Between Trail Mucus and Adhesive Mucus From Marsh Periwinkle Snails

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The composition of the adhesive form of marsh periwinkle mucus was compared to the trail mucus used during locomotion. The trail mucus consists primarily of large, carbohydrate-rich molecules with some relatively small proteins. In contrast, the adhesive mucus has 2.7 times as much protein with no significant difference in carbohydrate concentration. The resulting gel has roughly equal amounts of protein and carbohydrate. This substantial increase in protein content is due to the additional presence of two proteins with molecular weights of 41 and 36 kD. These two proteins are absent from the trail mucus. Both proteins are glycosylated, have similar amino acid compositions, and have isoelectric points of 4.75. This change in composition corresponds to an order of magnitude increase in tenacity with little clear change in overall concentration. The difference between adhesive and non-adhesive mucus suggests that relatively small proteins are important for controlling the mechanics of periwinkle mucus.

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