

Brief communication

Carbohydrate-binding Specificity of the Carrot Lectin

$C_{HEH} \cdot M_{IN}$ S_U and $M_{ING} \cdot K_{AI}$ C_{HERN}^*

The normal saline extract of the root of carrot could agglutinate rat erythrocytes had been demonstrated⁽¹⁾. The carbohydrate-binding specificity of the carrot lectin was examined in this study by hemagglutination inhibition method.

One hundred gm carrot root was extracted with 500 ml 5% acetic acid solution in a mixer and centrifuged at 10,000 xg for 30 minutes. The supernatant obtained was adjusted to pH 7.0 with conc NaOH, dialyzed against distilled water and lyophilized. Hemagglutination titer of the extract and inhibition of hemagglutination by carbohydrates were carried out in test tubes as previously described⁽²⁾.

The carbohydrates used in this experiments were D-glucose, D-galactose, D-mannose, D-fructose, L-fucose, D-glucosamine, D-galactosamine, N-acetyl-D-glucosamine, N-acetyl-D-galactosamine, D-arabinose, D-ribose, D-xylose, maltose, cellobiose, lactose and sucrose. All of the carbohydrates were bought from Sigma company.

The results were shown in Table I. Among the 16 kinds of the carbohydrate tested, only D-mannose, D-fructose, L-fucose, D

-glucosamine and D-galactosamine had high inhibitory effect on the hemagglutination activity of the carrot lectin. The carrot extract could agglutinate rat erythrocytes at the concentration of 1 μ g/ml. In the presence of 5 mM D-mannose, D-fructose, L-fucose, D-glucosamine or D-galactosamine, hemagglutination inducible concentration of the extract was increased to 15 or 30 μ g/ml.

REFERENCES

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Table 1. Inhibition of hemagglutination activity of the carrot extract by carbohydrates.

Carbohydrate (5 mM)	Hemagglutination titer
None	1024
D-Mannose	64
D-Fructose	32
L-Fucose	64
D-Glucosamine	32
D-Galactosamine	64

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胡蘿蔔凝集素的醣黏結特異性

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取胡蘿蔔一百公克置果汁機中，用五百毫升 5% 醋酸水溶液萃取，在一萬倍重力下離心三十分鐘後，取得澄清之萃取液。萃取液以氫氧化鈉溶液中和並置蒸餾水中透析後，用冷凍乾燥法乾燥之，而得到胡蘿蔔萃取物。

在試管中測定胡蘿蔔萃取物，對大白鼠紅血球的凝集活性。並觀察十六種醣類在 5 mM 濃度下，對胡蘿蔔萃取物紅血球凝集活性的影響。本實驗所用之醣類如下：D-葡萄糖、D-半乳糖、D-甘露糖、D-果糖、L-岩藻糖、D-葡萄糖胺、D-半乳糖胺、N-乙醯-D-葡萄糖胺、N-乙醯-D-半乳糖胺、D-阿拉伯糖、D-核糖、D-木糖、麥芽糖、纖維=糖、乳糖和蔗糖。

實驗結果顯示十六種醣類之中，只有 D-甘露糖、D-果糖、L-岩藻糖、D-葡萄糖胺和 D-半乳糖胺等五種醣類，對胡蘿蔔凝集素的紅血球凝集活性，有顯著的抑制作用。胡蘿蔔萃取物在 1 微克/毫升的濃度下，就有紅血球凝集的作用。但在 5 mM 上述五種醣類存在下，萃取物的濃度必須提高到 15 或 30 微克/毫升，才有紅血球凝集的作用。