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Author	友田, 正司(Tomodara, Masashi) 嶋田, 和代(Shimada, Kazuyo) 今野, 長八(Konno, Chohachi) ヒキノ, ヒロシ(Hikino, Hiroshi)
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The Structure of Panaxan B, A Hypoglycemic Glycan of *Panax ginseng**

Masashi TOMODA, Kazuyo SHIMADA, Chohachi KONNO** and Hiroshi HIKINO**

友田正司, 嶋田和代, 今野長八**, ヒキノヒロシ**

The roots of *Panax ginseng* C.A. MEYER has been utilized as an elixir in Oriental medicine. This crude drug has long been known to possess the ability to lower blood sugar level in normal and experimentally-induced hyperglycemic animals. Recently, we have identified the hypoglycemic peptidoglycans, panaxan A, B, C, D and E, in ginseng and we have determined the partial structure of one of the main peptidoglycans, panaxan A. The present paper deals with the structural study of panaxan B, another main peptidoglucan in ginseng.

When panaxan B was subjected to gel chromatography on Sephacryl S-500, a value of *ca* 1 800 000 for the molecular weight was obtained. Quantitative determination showed that the component sugar of panaxan B was D-glucose (95.9%) and a small amount of peptide moiety was present (0.7%).

Panaxan B exhibited a high positive specific rotation ($[\alpha]_D +196^\circ$) and its $^1\text{H-NMR}$ spectrum disclosed two anomeric hydrogen signals at δ 4.88 (doublet, J 3 Hz) and 5.24 (doublet, J 3 Hz), and the ratio of their integrals was about 3 : 1. Thus α -linkage of all D-glucose units was deduced.

Among nine signals at δ 60.6, 65.3, 69.6, 70.2, 71.7, 73.3, 81.5, 97.9 and 99.6 observed in the $^{13}\text{C-NMR}$ spectrum of panaxan B, it was evident that those at δ 60.6 and 65.3 were attributable to the C-6 carbons, those at δ 73.3 and 81.5 ascribable to the C-3 carbons, and those at δ 97.9 and 99.6 assignable to the C-1 carbons. Therefore, it was concluded that α -glucose units are linked at the 1, 3 and 6 positions in panaxan B.

Methylation of panaxan B by the Hakomori's method afforded the fully methylated derivative which was hydrolysed with dilute H_2SO_4 in HOAc. The products were converted into alditol acetates and analysed by GC-MS. As a result, 2,3,4,6-tetra-*O*-methyl-D-glucose, 2,3,4-tri-*O*-methyl-D-glucose and 2,4-di-*O*-methyl-D-glucose were identified and their approximate molar ratio was 1.0 : 1.8 : 1.0.

Periodate oxidation of panaxan B consumed 1.47 mol of periodate per mol of component anhydro sugar unit with liberation of 0.83 mol of formic acid. When the periodate-oxidized product was reduced, hydrolysed and analysed, the residual glucose was obtained in a yield of 31.0%.

Accumulated data demonstrated that panaxan B is mainly composed of α -1 \rightarrow 6

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** 東北大学薬学部

linked D-glucopyranose units and possesses branches linked in part at the C-3 position. The ratio of terminals, branching positions and intermediate units should be *ca* 1 : 1 : 1.8 on the average. Judging from the above facts, there are more branchings in panaxan B than panaxan A.