



Nutrition for Good Health, Anti-ageing and Long Life Hyaluronic Acid, Glucosamine and Chondroitin

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Introduction

People are looking for materials effective for anti-ageing and long life for many years. I found that disaccharides and hyaluronic acid, glucosamine and chondroitin are closely related with anti-aging and long life.

It was also found that sulfo disaccharides work along with Klotho (anti-ageing gene found by Nabeshima). The disaccharides have similar structure with hyaluronic acid. Hyaluronic acid is a main constitutional substance of naval string, an umbilical cord (connecting tubes between placenta of mother and unborn-baby for the supply of nutrition). Hyaluronic acid is used as artificial skin to cover lost or wounded skin clinically and also used as cosmetic for anti-aging skin.

Hyaluronic acid, glucosamine, chondroitin are now used as health food by many persons in Japan.

19 million bottles of glucosamine and chondroitin were sold as nutrition supporting food. About 200 million bags of glucosamine, hyaluronic acid and chondroitin were being sold as health food for 11 years. In addition to the above mentioned, glucosamine and chondroitin are also being sold as nutritional supplements. Zeria Shinyaku is selling chondroitin as medicine for 60 years. Wada calcium pharmaceutical sold 10 million bags containing glucosamine, chondroitin sulfate and collagen as nutrition supporting food. About 5 million persons are drinking and eating these materials and enjoying with good health and long life. Average life in Japan male is 80.50 (third), female is 86.83 (top in the world). Food will be concerned with long life. I tried to find the reason why glucosamine, hyaluronic acid and chondroitin are very much consumed as nutrition supplements.

Scientists found a sulfo disaccharide from mouse liver cell. I planned to identify the real structure of this natural disaccharide by organic synthesis starting from known starting materials. I found that the disaccharides are glucuronosyl (1-3) glucoside and glucuronosyl (1-3) galactoside.

Hyaluronic acid is poly (glucuronosyl (1-3) glucoside) and chondroitin is poly (glucuronosyl (1-3) galactoside). Hyaluronic acid gives glucuronic acid and N-acetyl glucosamine by depolymerization. Chondroitin gives glucuronic acid and N-acetyl galactosamine by depolymerization.

Depolymerization of chitin gives N-acetylglucosamine. Depolymerization of chitosan gives glucosamine.

Klotho combine glucuronic acid and glucosamine to afford disaccharide.

Klotho makes disaccharide from glucosamine and glucuronic acid and co-working with produced disaccharide on site and contribute to calcium homeostasis and subsequent health and anti-ageing. Glucosamine, chondroitin and hyaluronic acid are starting material to make sulfo disaccharide.

Conclusion

For good health, anti-ageing and long life, I advise you to eat as many kinds of vegetable, fish and meat as possible, Hyaluronic acid is found in the highest concentrations in fluids in the eyes and joints. Then enough hyaluronic acid, glucosamine and chondroitin will be supplied. You need not buy supplements, hyaluronic acid, and glucosamine if you eat enough vegetable, fish and meat.

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