

Food Containing Hyaluronic Acid and Chondroitin is Essential for Anti-Aging

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Abstract

Anti-aging reagent (sulfo disaccharides) co-workwith the anti-aging gene(Klotho) to regulate Ca^{2+} homeostasis, and afford consequent anti-aging and long life. Hyaluronic acid,chondroitin and glucosamine are precursors of anti-aging reagents. Food containing hyaluronic acid, chodroitin and glucosamine is essential for anti-aging, long life andgood health.

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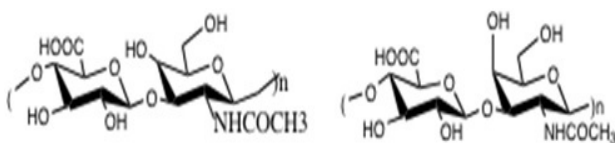
Introduction

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

Following story exists for long time, never throw away umbilical cord, naval string and keep it at poulownia chest of drawers for long time, and when you get incurable sickness, boil it in water for long hours, then drink the solution, then heavy sickness will be cured. I wish to explain the reason why umbilical cord (main component is hyaluronic acid) is so effective Hyaluronicacid, chondroitin, glucosamine are now sold from several companies as health food and several million persons are drinking and eating these materials and enjoying health and long life. Hyaluronic acid is used as cosmetics for anti-aging skin. By the studies of disaccharide,I found the reason why these compounds are consumed as health food.

Anti-Aging Reagent: Sulfodisaccharide. Relation with Hyaluronicacid, Chondroitin and Glucosamine

Anti-aging reagent (sulfo disaccharides) co-works with the anti-aging gene (Klotho) to regulate Ca^{2+} homeostasis, and afford consequent anti-aging and long life. Hyaluronic acid was first isolated from the bovine vitreous body in 1934 by Karl Meyer, a professor at Colombia University. The name hyaluronic acid is derived from hyaloids which means vitreous body in Greek. Hyaluronic acid is a linear polysaccharide. It has a repetitive structural unit composed of the disaccharides N-Acetyl D-glucosamine and D-glucuronic acid. Hyaluronic acid presents in our bodies and exist as a high molecular weight of several million times.

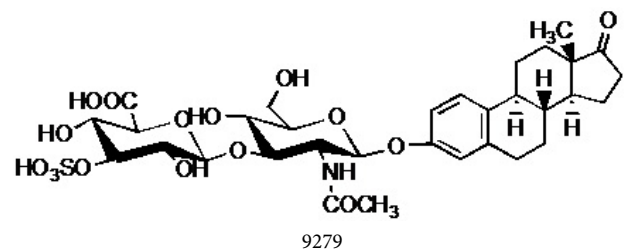


Hyaluronic acid

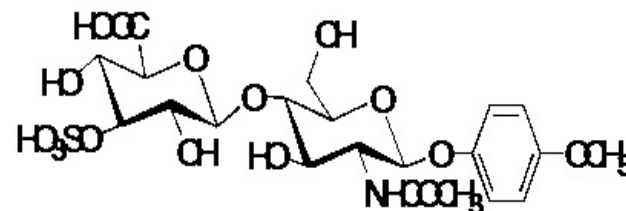
Chondroitin

Nabeshima found Klotho (anti-aging gene) [1]. Since then many reports on Klotho [2-29] are published. By synthesizing several sulfo disaccharide [30], these sulfo disaccharide can bind with Klotho. These band conjugate can exercise their function, Ca^{2+} homeostasis

and anti-aging [31,32]. I have synthesized several sulfo disaccharides like 9279 and 9294 [30,32].

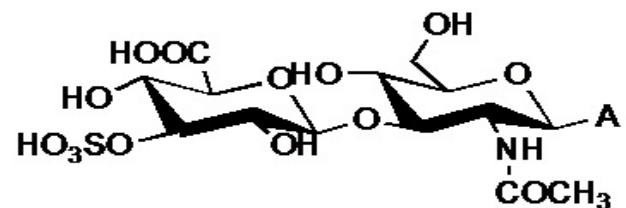


9279



9294

I found that these compounds having following general formulas are anti-aging reagents.

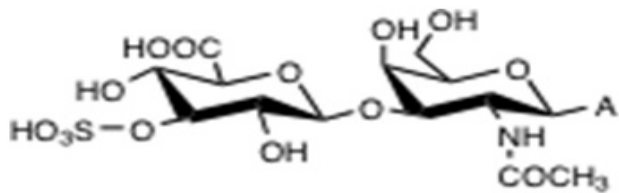


Sulfo Glucuronosyl(1-3)-Glucoside

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(A: attached molecule like estrone, vitamine D, amino acid, oligo peptide)

I found that these disaccharide (anti-aging reagent) co-work with Klotho (anti-aging gene). The disaccharides have similar structure with hyaluronic acid and chondroitin. A relation between the disaccharide, Klotho, hyaluronic acid, chondroitin, glucosamine with health and anti-ageing was found. Klotho makes disaccharide from glucosamine and glucuronic acid and co-works with produced disaccharide on site and gives stable Ca^{2+} homeostasis and consequent anti-aging and health [30, 31].

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.

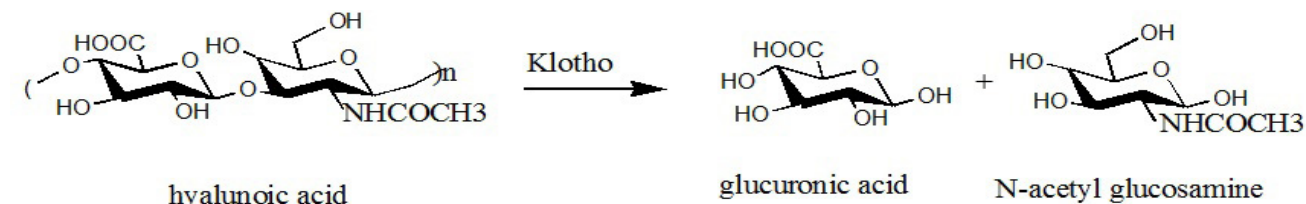
Hyaluronic acid, glucosamine, chondroitin are now used as health food by many persons in Japan.

About 5 million persons are drinking and eating these materials and enjoying health and long life. Average life in Japan: male is 80.50 (third), female is 86.83 (top in the world). Japanese eat much fish containing hyaluronic acid, chondroitin, chitin, chitosan. Food must be concerned with long life.

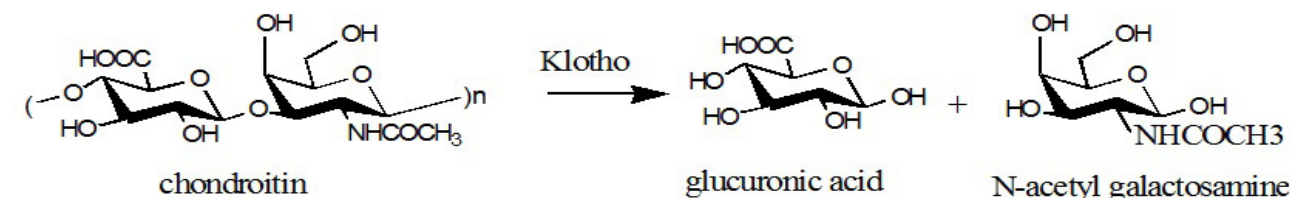
I tried to find the reason why glucosamine, hyaluronic acid and chondroitin are so much used. By the studies of glucosamine derivatives. I found reasons why these compounds are consumed as health food.

Nabeshima found a sulfo disaccharide from mouse livercell. 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 [30, 31].

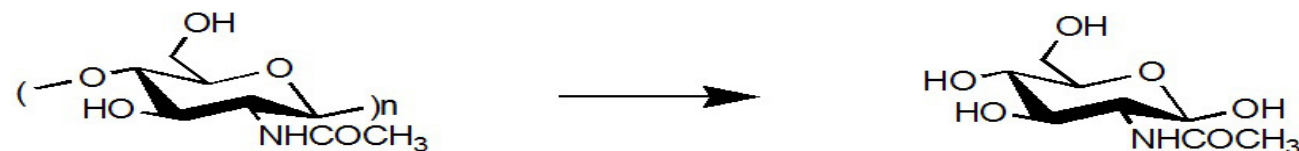
Hyaluronic acid is poly (glucuronosyl(1-3)glucoside) and chondroitin is poly (glucuronosyl (1-3)galactoside). Hyaluronic acid gives glucuronic acid and N-acetyl glucosamine by hydrolysis.



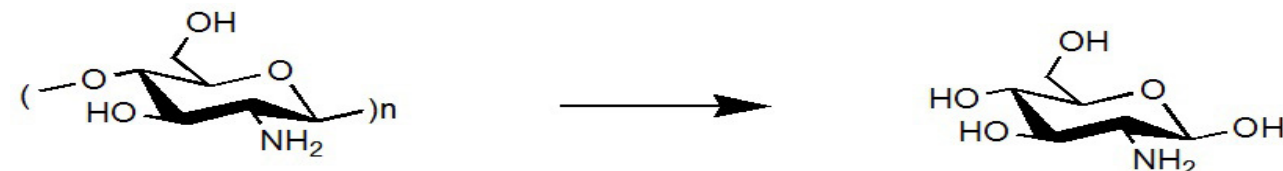
Chondroitin gives glucuronic acid and N-acetyl galactosamine by hydrolysis



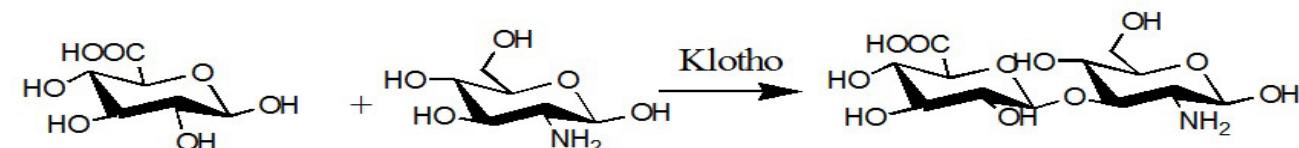
Depolymerization of chitin gives N-acetylglucosamine.



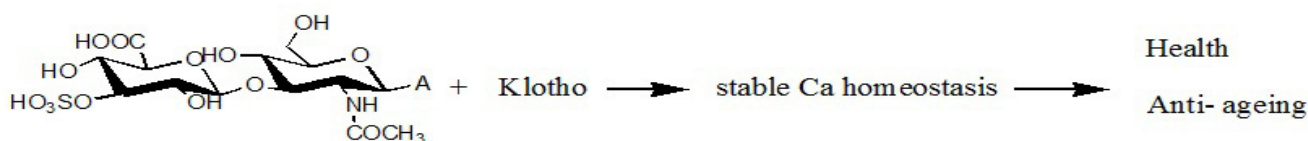
Depolymerization of chitosan gives glucosamine.



Klotho combines glucuronic acid and glucosamine to afford disaccharide



Klotho (anti-aging gene) co-work with the sulfodisaccharide (anti-aging reagents) on site to maintain stable Ca^{2+} homeostasis and subsequent anti-aging, long life and health.



Glucosamine, chondroitin and hyaluronic acid are precursor of anti-aging reagents : sulfo disaccharides.

Anti-Aging Food

For good health, anti-aging and long life, eating of food containing hyaluronic acid and chondroitin is essential. Eating of fish, whole body or head of fish or eye of fishes, like sea bream, house-mackerel, mackerel pike, sardine, ayu, gold eye sea bream, loach, eel, flat fish, shrimp, ikanago, kibinago, okoje, mebaru, shirasu, tsumire (crashed mixture of small fish), shark fin, tsukudani of small fish, nebaneba (stringy and sticky) food likenattou (fermented soybean), sea tangle, kelp, mozuku, yam and cartilaginous tissues of fish, cow, pig, chicken are recommended. Hyaluronic acid is found in the highest concentrations in vitreous in the eyes and joints. For the supply of glucosamine, shrimp and crab is good food. Then enough hyaluronic acid, chondroitin, glucosamine and Calcium are supplied and Ca^{2+} homeostasis is maintained and anti-aging, long life will be obtained.

Most chondroitin appears to be made from extracts of cartilaginous cow and pig tissues (cow trachea and pig ear and nose), but other sources such as shark, fish, and bird cartilage are also used.

Summary

To get anti-aging, eating of anti-aging food (like hyaluronic acid, chondroitin containing food) is essential.

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