Extended Abstract International Research Journal of Biochemistry and Bioinformatics 2021 Vol.11 No.1

Expression Profile of Non-Human Glycan, N-glycolylneuraminic acid (Neu5Gc) in Organs and Muscle Meat of Nine Animal Species

Bing Wang

Graham Centre for Agricultural Innovation, Charles Sturt University, Wagga Wagga, NSW, 2678, Australia

Abstract

The red meat-derived non-human sialic acid (Sia), N-glycolylneuraminic acid (Neu5Gc), has been reported to promote inflammation and cancer progression in humans. However, the expression level of Neu5Gc in muscle and organ tissues across different animal species remains unknown. We measured red meat-derived Neu5Gc in different regions of skeletal muscle and 7 organs of 9 animal species consumed across the world. We found that Neu5Gc was not expressed in muscles of kangaroos or dogs, and 7 organs of female deer. Expression levels of Neu5Gc is tissue and species-specific. Similar levels of glycans including Neu5Gc were expressed across 9 primal commercial cuts of sheep meat. The musculature across species contained lower concentrations of Neu5Gc than organ meats. Our study provides guidelines for the selection of animal meat products for consumers to prevent inflammatory disease and cancer progression.

Keywords: Sialic acid, N-glycolylneuraminic acid (Neu5Gc), muscle meat, organ meat, and animal species

.

Sialic acids are found widely distributed in animal tissues and related forms are found to a lesser extent in other organisms like in some micro-algae, bacteria and archaea. Sialic acids are commonly part of glycoproteins, glycolipids or gangliosides, where they decorate the end of sugar chains at the surface of cells or soluble proteins. However, sialic acids have been also observed in Drosophila embryos and other insects. Generally, plants seem not contain or display sialic acids.

In humans the brain has the highest sialic acid content, where these acids play an important role in neural transmission and ganglioside structure in synaptogenesis. More than 50 kinds of sialic acid are known, all of which can be obtained from a molecule of neuraminic acid by substituting its amino group of one of its hydroxyl groups. In general, the amino group bears either an acetyl or a glycolyl group, but other modifications have been described. These modifications along with linkages have shown to be tissue specific and developmentally regulated expressions, so some of them are only found on certain types of glycoconjugates in specific cells. The hydroxyl substituents may vary considerably; acetyl, lactyl, methyl, sulfate, and phosphate groups have been found.

This work is partly presented at 11th World Glycobiology Congress on May 17-18, 2021, Webinar