

Novel GH109 enzymes for bioconversion of group A red blood cells to the universal donor group O

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The ABO blood type classification is based on the composition of oligosaccharides on the surface of red blood cells (RBCs). Incorrect blood transfusions can have fatal consequences, emphasizing the critical importance of correct blood group availability. In this regard, it has been demonstrated that some GHs may be helpful in the conversion of groups A and B blood types to produce group O universal donor blood. Glycoside hydrolases (GHs) belonging to the GH109 family, could have the ability to convert blood from group A to group O.

Here, we report the biochemical characterization of three novel GH109 enzymes: NAg68, NAg69, and NAg71. These enzymes showed higher specificity on pNP- α -N-acetylgalactosamine compared to previously reported GH109 enzymes. In addition, the enzymes were able to act on purified antigen-A trisaccharides and convert human donor blood type A to group O.

NAg71 converted type A RBC to group O with increased efficiency in the presence of dextran compared to a commercially available GH109. These data demonstrated that this enzyme could represent a powerful tool for biomedical applications.

Reference

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