Purifying Bovine IgGs: A New Defense Against Antibiotic Resistance

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With the advent of biologic pharmaceuticals, it is necessary to consider how these therapeutic mechanisms can be utilized to combat growing global health concerns, namely antibiotic resistance. This study focused on validating a novel biologic to combat this challenge: bovine immunoglobulin Gs (IgGs). These naturally occurring antibodies lack attention in clinical research, yet are stable in the gastrointestinal tract, promote immune exclusion and are non antagonistic to human or commensal bacteria, thereby having potential to serve as a viable alternative to antibiotics. To test these novel IgGs, a systematic isolation/purification method from raw milk was developed- including ammonium sulfate precipitation, protein dialysis, and protein filtration. BCA Assay was utilized to measure and quantify IgG concentration, and a Kirby-Bauer Zone of Inhibition Test and antimicrobial susceptibility assay were employed in order to evaluate immunological function of the IgGs against pathogenic E. coli. IgG size was measured by Western blotting, to determine if the target antibody was successfully purified. The isolation and purification of IgGs using this method was successful, as evidenced by the following key findings: high protein yield in the BCA Assay, significant IgG immunological function at 1500 ug/mL with mean zone of inhibition distance of 7.0 mm, and western blotting where sample protein size matched known IgG size. These findings demonstrate that bovine IgGs have the potential to function as substitutes for antibiotics; additional research/application aim at developing IgG transfusions, examining viral neutralization capabilities, examining IgG interactions with mammalian cell lines, and considering lentiviral vector engineering to achieve continuous production of IgGs.

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