Career Profile: Investigating a Polysaccharide Targeting Vaccine and Autism

This activity is based on the work of Prof. Mario Monteiro. He is a professor in the Department of Chemistry at the University of Guelph. He was voted among the world's most influential people in the development of vaccines in 2014 by his peers. One of his discoveries, a vaccine to combat *Camplyobacter jejuni* has just entered clinical human trials. This vaccine targets the bacteria that contributes to "Traveller's Diarrhea" and was developed in conjunction with the U.S. Naval Medical Research Center. For more information on Prof. Monteiro's work, his laboratory and research opportunities you can visit his university website http://www.uoguelph.ca/~monteiro/

Prof. Monteiro's work has led him and his team to investigate the use of vaccines in the gastrointestinal disorders of autistic children. Proceed to the following URL and answer the questions that follow.

"Vaccine Machine" by Roberta Staley in the Canadian Chemical News
http://www.cheminst.ca/magazine/feature-story/vaccine-machine.

1. Why were parents so interested in volunteering their autistic children for clinical research?

2. What is the "gut-brain" balance?

3. What chemicals released by bacteria in the gut are suspected of causing problems for autistic children? Where do these chemicals cause problems? Explain.

4. What happened when autistic children suffering from diarrhea were prescribed antibiotics?

5. Compare how polysaccharide vaccines work to conventional vaccines.

6. What is a drawback of polysaccharide vaccines? How is Monteiro and others trying to overcome this problem? (Note: a zwitterion is a molecule with multiple charges but overall neutral)

7. What are two benefits of using polysaccharide vaccines? (Note: an oligosaccharide is a polysaccharide containing approximately 3-9 sugars)

8. How long does it take to bring a vaccine to market?

9. What is the target for Monteiro's *C. difficile* vaccine?

Extension

In conversation with Prof. Monteiro he expressed concern that there is a controversial history linking autism and vaccines. He is very careful in how he presents his work in light of this history. Research the connection between autism and vaccines, and comment on why you think Prof. Monteiro proceeds cautiously.