

## PEI: Surfaces that resist protein absorption

What do you do when doctors put a life-saving device in your body and your body then slowly proceeds to kill it? That's the problem often faced by patients who have devices such as heart pacemakers, or prostheses like artificial heart valves, implanted to address life-threatening conditions.

For Aaron Zidichouski, 18, a Grade 12 student at Charlottetown Rural High School, the answer was obvious – hide the device or the prosthesis using the cellular equivalent of Harry Potter's "invisibility cloak."

Aaron won first place in the Prince Edward Island regional judging of this year's Sanofi Aventis BioTalent Challenge.

Says Aaron: "Over time, proteins adhere to the surfaces of these devices and prostheses. So something with moving parts, like an artificial heart valve, will gradually get gummed up with the proteins and will need to be replaced.

"The specific objective of my research project was to identify a surface that would resist the absorption of proteins while encouraging the adhesion of the body's own cells. This would effectively 'hide' the device from the body's immune system and either reduce rejection or eliminate it completely. The larger objective was to determine what physical properties of surfaces are needed to engineer better, longer-lasting devices or replacements parts for the human body."

Working with his mentor, Dr. Bob Chapman, of the National Research Council and adjunct professor of chemistry at the University of Prince Edward Island, Aaron tested seven surfaces and used a biosensor to measure the adsorption of two proteins and nanoparticles representing human cells.

His findings offer the promise one day of a coating for implanted devices to improve the chances of their long-term success.