





An aerial photograph of a large, multi-story stone building, likely a university residence hall or administrative building. The building features a mix of light and dark stone, numerous windows, and a prominent Gothic-style arched entrance on the left side. In the foreground, there is a paved walkway, green lawns, and several trees. A few people are visible walking on the path. The sky is overcast.

\$2B

economic impact

An aerial photograph of a shipping container yard. The containers are stacked in neat rows, with colors including white, red, blue, and grey. The yard is situated on a body of water, with a dark blue background that transitions into the water's surface. The text "\$1.4B" is overlaid in large white font on the right side of the image.

\$1.4B

export value

A photograph of two women in a professional setting. One woman, wearing a patterned blazer, is pointing at a whiteboard. The other woman, wearing a dark hijab and a dark blazer, is looking towards the whiteboard. The background shows a cityscape through a window.

90%

employed after graduation



\$300M

research funding

A group of diverse international students sitting together and smiling. The image is darkened to serve as a background for the text. The students are of various ethnicities and are dressed in casual attire. One student in the foreground is wearing a blue turban and a purple shirt. Another student is wearing sunglasses and a blue top. The overall atmosphere is positive and inclusive.

71%

of international students  
stay in Nova Scotia

A group of diverse students walking on a university campus. In the background, there is a large, light-colored building with arched windows and green trees. The students are dressed in casual attire, some with backpacks. The overall scene is bright and sunny.

\$200M

provincial tax revenues

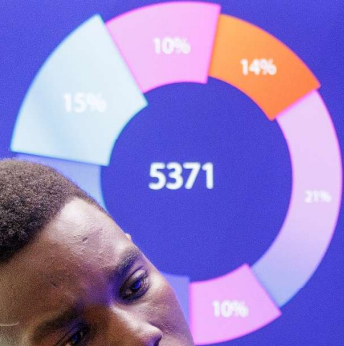
More doctors







More  
innovation





 **VICTOR PHILLIP DAHDALEH HALL**  
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### Examining Gold-Nanocluster-Allelerin Bioconjugates for Immunotherapy Treatment

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#### Introduction

The aim of this project is to investigate the effect of gold nanoclusters (AuNCs) on the immunogenicity of an allergen (LipA) when conjugated together. The AuNCs are synthesized using a seed-mediated growth method and are characterized by UV-Vis spectroscopy and DLS. The LipA protein is purified and its structure is determined using X-ray crystallography. The conjugates are prepared by mixing AuNCs with LipA in the presence of a cross-linker (BSA) and are characterized by UV-Vis spectroscopy and DLS. The immunogenicity of the conjugates is tested using a mouse model.

#### Methods

**AuNC Synthesis:** A seed-mediated growth method was used to synthesize AuNCs. The seed solution was prepared by mixing HAuCl<sub>4</sub> and NaBH<sub>4</sub> in the presence of citrate. The growth solution was prepared by mixing AuCl<sub>3</sub> and NaBH<sub>4</sub> in the presence of citrate. The AuNCs were synthesized by adding the seed solution to the growth solution.

**LipA Purification:** LipA was purified from a bacterial culture using a series of chromatography steps. The protein structure was determined using X-ray crystallography.

**Conjugation:** The AuNCs and LipA were conjugated in the presence of BSA. The conjugates were characterized by UV-Vis spectroscopy and DLS.

#### Results and Discussion

**AuNC Characterization:** The AuNCs were characterized by UV-Vis spectroscopy and DLS. The UV-Vis spectra show a surface plasmon resonance (SPR) peak at approximately 220 nm. The DLS data show a narrow size distribution with a mean diameter of approximately 10 nm.

**LipA Characterization:** The LipA protein was purified and its structure was determined using X-ray crystallography. The structure shows a protein with a molecular weight of approximately 100 kDa. The protein is composed of two subunits, each with a distinct domain.

**Conjugation:** The AuNCs and LipA were conjugated in the presence of BSA. The conjugates were characterized by UV-Vis spectroscopy and DLS. The UV-Vis spectra show a shift in the SPR peak to approximately 230 nm, indicating the formation of the conjugates. The DLS data show a larger size distribution with a mean diameter of approximately 150 nm.

**Immunogenicity:** The immunogenicity of the conjugates was tested using a mouse model. The results show that the conjugates are more immunogenic than the individual components.

#### Conclusion

The results of this study show that the conjugates of AuNCs and LipA are more immunogenic than the individual components. This suggests that the AuNCs enhance the immunogenicity of the allergen. The conjugates may be used as a vaccine for the treatment of allergic diseases.

#### References

1. [Citation 1]  
2. [Citation 2]  
3. [Citation 3]

Victor Martinez Macias



An aerial photograph of a university campus during sunset. The sun is low on the horizon, casting a warm orange glow over the scene. The campus features numerous brick buildings, green lawns, and a central road. The text "When universities thrive, Nova Scotia thrives." is overlaid in white, bold, sans-serif font across the middle of the image.

When universities thrive,  
Nova Scotia thrives.

An aerial photograph of a university campus during the golden hour of sunset. The scene is filled with various university buildings, including a prominent central building with a dome and a large green sports field. The campus is surrounded by lush green trees. In the background, a city skyline and a large body of water are visible under a warm, orange-hued sky. The text "What happens when we treat our universities as essential infrastructure for growth?" is overlaid in the center in a large, white, sans-serif font.

What happens  
when we treat our  
universities as essential  
infrastructure  
for growth?















