Development of a *Bovine papillomavirus* VLP vaccine in bacterial host

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Bovine papillomatosis (BP) is an infectious disease, presenting multiple benign epithelial proliferative lesions. BP causes economic losses, since affected animals usually show delayed development, weight loss, reduction of milk flow and leather quality. There are not yet commercial vaccines against BPV available up to date. Here, we developed an integrated study about the L1 capsid protein of BPV-1, obtained from bacterial expression system, concerning its purification, biosafety, thermo-stability and immunogenicity. The recombinant protein was expressed in bacteria and purified by Affinity and Ion Exchange chromatography. Circular dichroic (CD) spectra analysis indicated the correct folding of the recombinant L1 protein, suggesting a predominantly β-sheet structure. The thermostability of the recombinant L1 was accessed through the CD signal. Provided data revealed a TM value of 55.7°C. The biosafety of the recombinant L1 protein was evaluated by the cytokinesis-blocked micronucleus test. This test detected a high frequency of micro nucleated cells in the positive control, which was not verified in both the negative control and in the cells treated with the L1 recombinant protein. Complementally, comet assay indicated similar results. A heterogenic complex of structures was observed with Transmission Electron Microscopy, with a consistent conformation of both incomplete and complete VLPs, with approximately 45 and 55 nm, respectively. Structural capsomeres were also found nearby the virus-like particles. For prophylactic test, we inoculated by intradermal injection young calves. After 30 days of the booster dose, antibody levels in control group did not increase. On the other hand, the group that received two vaccine doses showed a significant high production of specific antibodies against recombinant L1 of BPV-1. Our strategy can be useful to evaluate the efficacy and the safety of different recombinant vaccine candidates. Moreover, described recombinant VLPs has proved to be a viable approach for designing new vaccines against other PVs species, including the human papillomavirus.

Speaker Biography

Diego Grando Módolo has a PhD degree in Genetics and Molecular Biology, and many years of experience in production of recombinant antigens in plants and bacteria. He has his expertise in expression and characterization of recombinant vaccines, including the production of papillomavirus virus-like particles. He is working at Butantan Institute, in the Research and Development of innovative solutions in the area of animal or human health using his experience in biotechnology to produce biomolecules of pharmaceutical interest.

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