7TH GLOBAL FORUM ON TB VACCINES | 8-10 October 2024 Rio de Janeiro, Brazil
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Recombinant BCG vaccine rBCG-LTAK63 enhances autophagy in innate immune cells

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Introduction: Autophagy is a cellular recycling process that also plays a role in the immune response and can lead to better protection against tuberculosis. We have previously developed a recombinant BCG strain expressing the detoxified A subunit of the LT toxin of Escherichia coli (rBCG-LTAK63), which demonstrated the capacity to induce robust adaptive immune responses and confer protection against Mycobacterium tuberculosis challenge. This study we evaluated the induction of autophagy, a critical innate immune mechanism, by the rBCG-LTAK63 vaccine.

Methods: Murine bone marrow-derived macrophages (BMDMs) were exposed to rBCG-LTAK63 (MOI 10; 6 h). LC3, the main biomarker associated with the induction of autophagy evaluated by Western blot. To evaluate if the induction of autophagy in BMDM would affect the antigen presentation, BMDMs were pretreated with rapamycin (inducer) or 3-methyladenine (inhibitor) and infected with BCG or rBCG-LTAK63 (MOI 10; 6 h). Splenocytes from naive mice were added and co-cultured for 48 h and evaluated for immune activation.

Results: Our findings reveal that rBCG-LTAK63 triggers a higher delipidation of LC3, indicated by the conversion of LC3-I to LC3-II, in BMDMs. Characterization of T cell activation indicated the role of autophagy in the antigen processing and presentation.

Conclusion: The engagement of innate immune mechanisms profoundly influences the progression of adaptive responses. This study offers preliminary evidence supporting the role of autophagy induced by rBCG-LTAK63 in macrophages and its role in the induction of protective immune responses by T cells.

Funding Sources
FAPESP (2022/13917-9; 2017/24832-6) and Butantan Institute

Conflicts of Interest
None