Investigating the Role of the Retinoblastoma Protein in the Expression of Immunosuppressive Factors

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ABSTRACT

Lung cancer remains one of the deadliest types of cancer, causing approximately 160,000 deaths per year in the US alone. Because of its poor detection techniques and highly invasive abilities, conventional treatments -such as radiation and chemotherapy- fail to improve long-term survival of patients. At the moment, the 5-year survival rate for all stages of lung cancer is only 16%. Recent breakthroughs in cancer research establish immunotherapy, which involves the stimulation of the immune system to target and attack cancer cells, as a highly promising alternative treatment against this deadly disease. However, the efficiency of this treatment varies on each subset of cancer. A more efficient therapeutic strategy should include the targeting of immunosuppressive factors along with key proteins that are responsible for lung tumor growth. A possible target is the Retinoblastoma protein (Rb). This well-known tumor suppressor regulates a diverse set of cellular processes such as cell cycle progression and cell adhesion. Inactivation of Rb results in uncontrolled cell proliferation, which is a major driving force behind tumorigenesis. Recent findings suggest a new role for Rb in regulating immune system function. To further characterize this emerging role of Rb in immune function, the protein expression of PD-L1, PD1, OX-40, OX40L, B7-H3 and B7-H4 was analyzed via immunoblotting in Rb-activated and Rb-inactivated lung cancer cell lines. Our hypothesis is that Rb will affect the expression of these immunosuppressive factors in tumor cells. Preliminary results show that PD-L1 and OX-40 expression is correlated to Rb active status, while PD1 and OX40L are expressed when Rb is inactivated.

Key Words: Lung cancer, Immunotherapy, Retinoblastoma protein, Western Blot

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