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Antibacterial properties of new bacterium isolated from date palm leaves affected by brittle leaf disease

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An actinomycete strain was isolated from date palm leaves affected by brittle leaf disease (Deglet Nour, Tunisia). The strain was classified as a new bacterium, an endophytic strain. Identification was based primarily on the morphological characteristics. This strain was grown on a medium rich tryptic soy broth (TSB) with K2HPO4 (1 mM) and MgSO4, 7H2O (2 mM) at 28°C and neutral pH. It is a Gram-positive filamentous bacterium with broad spectrum antimicrobial activity. The optimum pH for the product was 7 to 7.4. The highest product yield was with glucose and tryptone at 1% (w/v) as carbon and nitrogen sources, respectively. Incubation between 25°C and 30°C for 24 hours was optimal for the bioactive metabolite(s) production. The product remained stable up to 50 hours. The bioactive metabolite(s) produced by endophytic bacteria was partially purified and studied for antibacterial characteristics using the wells technique. Analysis by bioautography and gas chromatography/mass spectroscopy (GC/MS) of the supernatant from precipitation with 100% ammonium sulphate indicated that the strain produced a high percentage of fatty acid. Additionally, a cyclic compound could be involved in the antibacterial activity. After silica plate scraping, bioactivity disappeared at 70°C. Bioactive molecule(s) may be involved in the brittle leaf disease, because its product isolated by a strain from date palm leaves is affected by the brittle leaf disease enough. In addition, this endophytic has shown best lipolytic activity and produced a lipidic biomolecule(s), this result explains the implication of metabolite(s) in the brittle leaf disease. Finally, determination of MIC and MBC of bioactive molecule(s) against strains (Bt, Bs).

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A novel "priming-boosting" strategy for immune interventions in cervical cancer

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Despite the encouraging development of a preventive vaccine for human papillomavirus (HPV), it cannot improve ongoing infections. Therefore, a new vaccine is urgently needed that can prevent and treat cervical cancer, and cure pre-cancerous lesions. In this study, we constructed two peptide-based vaccines. The first was a short-term, long-peptide (ST-LP) vaccine that simultaneously targeted three key carcinogenic epitopes (E5-E6-E7) on HPV16. We tested this vaccine in murine TC-1 cells infected with a recombinant adeno-associated virus (rAAV) fused with HPV16E5 DNA (rTC-1 cells), which served as a cell model; we also tested it in immune-competent mice loaded with rTC-1 cells, which served as an ectopic tumor model. The ST-LP injections resulted in strong, cell-mediated immunity, capable of attacking and eliminating abnormal antigen-bearing cells. Furthermore, to prolong immunogenic capability, we designed a unique rAAV that encoded the three predicted epitopes for a second, long-term, long-peptide (LT-LP) vaccine. Moreover, we used a new immune strategy of continuous re-injections, where three ST-LP injections were performed at one-week intervals (days 1, 8, 15), then one LT-LP injection was performed on day 120. Our *in vitro* and *in vivo* studies revealed that this strategy could boost the immune response to produce longer and stronger protection against target cells, and mice were thoroughly protected from tumor growth. Our results showed that priming the immune system with the ST-LP vaccine, followed by boosting the immune system with the LT-LP vaccine could generate a rapid, robust, durable cytotoxic T-lymphocyte response to HPV16-positive tumors.

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