Synthetic Vaccine Particles-Rapamycin

National Cancer Institute

Source

National Cancer Institute. Synthetic Vaccine Particles-Rapamycin. NCI Thesaurus. Code C147562.

A proprietary, biodegradable, poly (lactic-co-glycolic acid) (PLGA) nanoparticle-based formulation composed of synthetic vaccine particles (SVP) encapsulating the macrolide antibiotic rapamycin (SVP-R), with immunosuppressant and drug-protective activities. Upon administration of SVP-R, the SVP moiety is selectively and preferentially taken up through endocytosis by antigen-presenting cells (APCs), located in the spleen and lymph nodes, specifically dendritic cells (DCs). Rapamycin, a mammalian target of rapamycin (mTOR) inhibitor, prevents DC maturation, induces tolerogenic DCs, induces regulatory T-cells (Tregs), blocks activation of effector T-cells, induces B-cell tolerance, reduces B-cell activation, and prevents antibody formation, thereby inducing immune tolerance. When co-administered with a biological immunogenic drug known to induce the production of anti-drug antibodies (ADA), SVP-R is able to prevent ADA formation, which prevents the unwanted neutralizing effects of ADAs, increases efficacy of the biological drug, and permits sustained therapeutic activity and repeated administration of the biological drug. In the presence of a specific target antigen, SVP-R is able to prevent an antigen-specific immune response and induces antigen-specific immune tolerance. Compared to the administration of free rapamycin, SVP-R induces long-lasting immunological tolerance.