Breadth of T cell responses after immunization with adenovirus vectors encoding ancestral antigens or polyvalent papillomavirus antigens

Oncogenic human papillomaviruses (HPVs) are in most cases eliminated by intervention of T cells. As many other pathogens, these oncogenic HPVs belong to an ancient and diverse virus family. Therefore, we found it relevant to investigate the potential and limitations of inducing a broad response - either by inducing cross-reactive T cells or by administering a polyvalent vaccine. To test these strategies, we designed 3 ancestral and 2 circulating sequences based on the two domains of the E1 and E2 proteins of papillomaviruses (PVs) that exhibit the highest degree of conservation in comparison to the other PV proteins. The PV sequences were fused to a T cell adjuvant, the murine invariant chain and encoded in a recombinant adenoiral vector which was administered to naïve outbred mice. By measuring T cell responses induced by these different vaccines and towards peptide pools representing 3 circulating strains and a putative ancestor of oncogenic HPVs, we showed that the ancestral vaccine antigen has to be approximately 90% identical to the circulating PVs before a marked drop of ~90% mean CD8+ T cell responses ensues. Interestingly, the combination of two or three type-specific PV vaccines did not induce a significant decrease of the CD8+ T cell response to the individual targeted PV types. Polyvalent HPV vaccine based on the E1 and E2 proteins seem to be capable of triggering responses towards more than one type of PV while the cross-reactivity of ancestral vaccine seems insufficient in consideration of the sequence diversity between HPV types.

General information
Publication status: Published
Organisations: Center for Biological Sequence Analysis, Department of Bio and Health Informatics, Disease Intelligence and Molecular Evolution
Contributors: Ragonnaud, E., Pedersen, A. G., Holst, P. J.
Pages: 182-190
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Scandinavian Journal of Immunology
Volume: 85
Issue number: 3
ISSN (Print): 0300-9475
Ratings:
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.11 SJR 0.891 SNIP 0.638
Web of Science (2017): Impact factor 2.314
Web of Science (2017): Indexed yes
Original language: English
Electronic versions:
sji12522.pdf
DOI:
10.1111/sji.12522
Source: FindIt
Source ID: 2351358094
Research output: Contribution to journal › Journal article – Annual report year: 2017 › Research › peer-review