P 53 CROSS-KINGDOM VACCINES: DOGMA AND HERESY

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A vaccine made up by an algal β-glucan (laminarin; β-1-3 glucan with occasional β-1-6 single glucose side chains), conjugated with diphtheria toxoid as a carrier protein component, protects against infections by different fungi and induces antibodies capable of inhibiting fungal growth. This is a sort of "cross-kingdom" vaccine because the immunizing antigen and the vaccination target belong to two different kingdoms, and this is certainly the first case in the field of human vaccines, which are generally based on the dogma "one or more specific antigens against one disease or syndrome". Thus, it is "heretically" possible to convey in a single immunological tool the potential to protect against multiple infections, in our case all those caused by β-glucan-expressing microorganisms (practically all human pathogenic fungi and some bacteria). The generation of antibodies with the potential of directly inhibiting the growth of, or killing the fungal cells also opens an exciting perspective for both active and passive vaccination in immunocompromized subjects.

The above approach could be theoretically extended to non-fungal infections by selecting the appropriate molecular pattern shared by a given microbial group (*e.g.* peptidoglycan for Gram positive bacteria). Noteworthy, the molecular patterns are those microbial molecules which foster innate immunity through their binding to the pattern-recognition structures on host cells. Thus, single-component, molecular pattern-based vaccines would merge the broad target range typical of innate immunity with the highly focussed specificity of the adaptive immunity.