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16<sup>th</sup> Euro Global Summit and Expo on

## Vaccines & Vaccination

## Tumor liberated protein (TLP) as potential vaccine for lung cancer patients

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Tumor liberated protein (TLP) has been previously described as a TAA (complex) present in the sera from lung cancer patients with early stage disease. Since early detection improves overall survival in lung cancer, identification of screening biomarkers for patients at risk for the development of this disease represents an important target. Starting from the peptide epitope RTNKEASI previously isolated from TLP complexes, we generated a rabbit anti-RTNKEASI serum. This antiserum detected and immuno-precipitated a 55 kDa protein band in the lysate of the lung cancer cell line A549. This protein band was identified as aldehyde dehydrogenase isoform 1A1 through mass spectrometry, revealing the molecular nature of at least one component of the previously described TLP complex. Next, we screened a cohort of 29 lung cancer patients (all histologies), 17 patients with non-neoplastic lung pathologies and 9 healthy donors for the presence of serum ALDH1A1 and global serum ALDH by enzyme-linked immunosorbent assay. This analysis indicated that the presence of ALDH was highly restricted to patients with lung cancer. Interestingly, the global ALDH test detected more lung cancer patients compared to the ALDH1A1-specific test, suggesting that other ALDH isoforms might add to the sensitivity of the assay. Our data suggest that ALDH levels may therefore be evaluated as part of a marker panel for lung cancer screening; approach for preventive and therapeutic application and represents a main target of this field of research.

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## Universally protective vaccines: A revolution in modern vaccinology

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To eliminate safety risks related to infectivity, inactivated pathogens and more suitably, well-characterized pathogen-derived antigens (Ags) have increasingly been used as immunogens in modern vaccines. The selection of these Ags is usually based on their capacity to induce immune responses that correlate with natural protection. These Ags, however, are known to be antigenically variable or conformation-dependent (e.g., B cell epitopes) and/or subject to immunogenetic restriction (e.g., linear, T-cell epitopes). In addition, the immunogenicity of good vaccinal Ags is largely dependent on memory CD4+ T helper cells. However, activation of the latter upon natural infection or foreign Ag exposure of genetically predisposed subjects can occasionally lead to immune pathology. Priming of CD4+ T helper cells by adjuvanted vaccines is, therefore, increasingly raising safety concerns. On the other hand, Ags that are highly conserved and vulnerable because of their exposure on the surface of infected or pathologically altered host cells are either not immunogenic or subvert the host immune system. Hence, they are not used as vaccinal Ags in contemporary vaccines. We consider that new technologies enabling immune targeting of these Ags by natural, MHC allotype-independent immune effector memory cells is the new Holy Grail in modern vaccinology.

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