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The search for a tuberculosis vaccine for adults: why can't we make progress?

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Many attempts to produce vaccines for adult type TB have failed because they have looked in the wrong place. It has recently been rediscovered that primary and post-primary TB are fundamentally different disease processes characterized by different types of lesions and host responses. Primary TB is the infection that develops in individuals who lack sufficient immunity to control MTB in granulomas. Post-primary TB, as its name implies, is the infection that develops after primary TB in people who have sufficient immunity to control MTB in granulomas. Post-primary TB develops asymptotically as part of latent TB for many months as bronchogenic spread of an obstructive lobular pneumonia before undergoing caseation necrosis that is either coughed out to produce a cavity or remains to become surrounded by granulomatous inflammation. Post-primary TB results from a localized susceptibility in part of the lung of a person with effective systemic immunity. The large majority of early post-primary lesions resolve spontaneously leaving no trace or a small scar in the apices of a lung. Regression characteristically takes place before the onset of caseous necrosis. If we understood why most early lesions regress, then we might find ways to make them all regress and thereby eliminate transmission. The developmental stage of post-primary TB appears to be a vulnerable stage of TB and a particularly attractive target for a vaccine to prevent disease and transmission. The challenge is to develop models and experimental designs to study it.

Biography

Robert L Hunter is Distinguished Professor and Chair of the Department of Pathology and Laboratory Medicine at UTHealth Medical School in Houston. His interest in TB began in medical school at the University of Chicago where he received his MD and PhD degrees. He has published over 200 scientific papers many of them on the biological activities of mycobacterial lipids. Alerted by inconsistencies in the literature, he spent over 10 years looking for and reviewing slides and publications on the early stages of untreated human pulmonary TB. This eventually resulted in discovery of a new paradigm for the pathogenesis of TB.

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