Table 1 Comparisons of Various Animal Models Used for Efficacy Testing of TB Vaccines

Characteristic	Mouse	Guinea pig	Cynomolgus monkey
Resemblance of the disease to human TB	Low	High	High
Genetic diversity	Inbred	Outbred	Outbred
Cost	Low	Moderate	High
Availability of immunologic reagents	High	Low	Moderate
Evolutionary closeness to humans	Low	Low	High
Standardization of model	High	High	Moderate

Table 2 Comparison of Tuberculosis in Humans and in Major Animal Models

Characteristic	Human	Guinea pig	Mouse	Cynomolgus monkey
Susceptibility to low doses of aerosolized *M. tuberculosis*	+	+	−	+
High tuberculin sensitivity	+	+	−	+
DTH characterized by dense mononuclear cell infiltrate	+	+	−	
Langhans giant cells in lesions	+	+	−	+/−
Caseation necrosis	+	+	−	+

Table 3 Prime Vaccines Against Tuberculosis Significantly More Potent than BCG in Animal Models

				Criteria by which significantly greater efficacy than BCG demonstrated					
Vaccine	Year	Mechanism	Animal model	↓CFU Lung	↓CFU Spleen	↓Pathology	↑Survival	Laboratory	Reference
RBCG30	2000	↑Expression Antigen 85B	Guinea pig	+	+	+	+	M. Horwitz	67,68
BCG::RD1-2F9	2003	↑Expression CFP10 + ESAT-6	Mouse; Guinea pig		+			S. Cole	74
M. tuberculosis 103drrC$^-$	2004	Attenuated *M. tuberculosis*	Mouse	+	+			J. Triccas	88
RBCGΔ*ureC*hly	2005	Phagosome perforation	Mouse	+	+			S. Kaufmann	79
RBCG38	2005	↑Expression 38 kDa protein	Mouse				+	Y. Lopez-Vidal	77
M. tuberculosis SO2	2006	Attenuated *M. tuberculosis*	Guinea pig			+	+	C. Martin	83
rBCG(*mbtB*)30	2007	↑Expression Antigen 85B; replication-limited	Guinea pig	+	+			M. Horwitz	97

Table 4 Booster Vaccines Against Tuberculosis That Significantly Enhance the Level of Protective Immunity Conferred by Parentally Administered BCG in Animal Models

				Criteria by which significantly greater efficacy Than BCG alone demonstrated					
Vaccine	Year	Antigen	Animal model	↓CFU Lung	↓CFU Spleen	↓Pathology	↑Survival	Laboratory	Reference
r30 (Antigen 85B)	2005	Antigen 85B	Guinea pig	+	+			M. Horwitz	99
MVA85A + Fowlpox 85A	2005	Antigen 85A	Guinea pig				+	A. Hill	102
Ag85B-ESAT-6	2006	Antigen 85B + ESAT-6	Mouse	+	+			P. Andersen	107,108

Abbreviations: BCG, Bacille Calmette–Guérin; CFU, colony-forming unit; MVA, modified vaccinia virus Ankara.