Consider the exact sequence of right R-modules $0 \to ann_r(a) \to R \xrightarrow{f} aR \to 0$ where f is defined by left multiplication by a. If aR is projective, this sequence splits. Then $ann_r(a)$ is a direct summand of R_R, so $ann_r(a) = eR$ for some $e^2 = e \in R$. Conversely, if $ann_r(a) = eR$ where $e^2 = e \in R$, then the direct sum decomposition $R = eR \oplus (1-e)R$ implies that $aR \cong R/eR \cong (1-e)R$, which is a projective right R-module.