Derivation of $F(\delta,n)$ from in vivo data of G. Funk (2003)

By assuming $\delta' = D \times \delta$ we are assuming that HIV-1 gene products kill the infected cell and that decreased expression of these genes correlates 1:1 with decreased mortality of the infected cell. Another possiblity is that the correlation is not 1:1.
G. Funk (2003) analyzed drug treatment data from 40 HIV-1 positive patients and showed that the burst size (n) correlates with cell death rate (δ). They determined the correlation parameters for δ vs. nδ via nonlinear regression to data:

$$\delta = a \times n + b$$

where $a = 4 \times 10^{-4}$ and $b = 0.21$
(Funk's other parameter values were 10 fold greater than ours so we take $a = 4 \times 10^{-3}$ and $b = 0.021$)

In the expanded crHIV-1 gene therapy model, the death rate for an I_D cell is $\delta' = F(\delta, n) \times \delta$ and the HIV-1 burst size from I_D cells is Dn.
Thus:

$$\delta' = a \times Dn + b$$

or

$$F(\delta, n) = \frac{aDn + b}{\delta}$$

Using $\delta' = F(\delta,n) \times \delta$ (i.e. $\delta' = aDn + b$) in place of $\delta' = D \times \delta$ does not visibly alter the results, since δ' cancels out of all steady state equations, except I_D (as explained in the next section).