Additional file 7. State Diagram: B Cell agents (Bs) in Zone 2.
Bs begin in a resting state in Zone 2. They require contact with antigen (Ag) or a Dendritic Cell agent (DC) that is presenting antigen that matches their pre-set specificity [82]. The fraction of Bs that is specific for any particular antigen is an input parameter to the simulation (PercentBAntiViral). The default fraction of specific Bs that was used for these experiments was 2% (Appendix B).

The DC also controls the response type of the B. If presentation of antigen is made by a DC1, the B will be type B1 and make antibody-1 (Ab1). Presentation by a DC2 will cause the B to become a B2 and make Ab2 (Table 1). The abbreviations B1 and B2 indicate different populations present in the simulation and are not meant to correspond to such designations in the literature for B lymphocytes [105]. If the B detects antigen available freely in the lymphatic fluid, any activated T Cell agent type (T1 or T2) that subsequently contacts the B will determine its response type.

Once the B has either seen soluble Ag (such as virus) or seen Ag presented by a DC, the B requires contact with an antigen matched T1 or T2 before it can produce Ab (States 2-5) [36]. Once the B makes contact with an activated, Ag-matched T, it may take one of two (stochastically determined) paths. It may become a germinal B (State 2), producing antibody and remaining in Zone 2, or a plasma cell (States 3 or 4), producing antibody and traveling to Zone 3. Specific T contact also causes the B to proliferate, the number of progeny produced at each contact is an input parameter to the simulation (NumB_ToSend). A sufficient number of subsequent Ag-specific DC contacts results in the formation of a long-lived memory B (State 5), with each contact extending the life of the B. A memory B may be reactivated (to States 3 or 4) by the contact of an Ag-specific T and the presence of cytokines in Zone 2.