**Table S9. Comparison of the outcomes of the full and reduced models in the presence of ABA in cases of node knockout or constitutive activation for which there is known experimental evidence.**

There were 76 relevant experimental observations reported in [1], which translate to 48 experimental observations for nodes of the reduced model (see Tables S2-S5). The results of simulated knockout or constitutive activation are compared with the simulated outcomes for the full model [1] and relevant experiments are cited. The first column names the various response categories, which are the same as in Table 3 of [1] and the simulation procedure is the same, as explained in the Methods section. Wild type (WT) refers to the unperturbed system. To evaluate the variance in the results (due to the stochasticity present in the initial conditions and order of node updates, see Methods), we performed 10 sets of simulations, where each set consisted of 4500 simulations over 50 time-steps. The average cumulative percentage of closure (CPC) for the WT simulation was 44.33, with a standard deviation of 0.023. Hypersensitive refers to the case when the simulation reaches 100% closure faster (in fewer time steps) compared to the WT simulation. Close to WT is the response category when the CPC lies within two standard deviations of the average WT CPC. Hyposensitivity refers to reaching 100% closure (i.e. all simulations) more slowly than the WT. Reduced sensitivity is the case when not all simulations can reach closure, i.e., the percentage of closure stabilizes at a value much less than 100%, while insensitivity means 0% closure in all simulations over all time-steps. The second column lists the number of cases in each category. The perturbations in the third column are organized in increasing order of their CPC values within each category. The fourth column lists the CPC range of each category. There were four cases (of 48 comparisons) where the simulation of the reduced model did not agree with the simulation of the full model in [1], these are listed in the last column. For each entry in this column, the response category according to the full model is listed in parentheses. In all the cases the full and reduced models agree that 100% closure will eventually be reached; the disagreement is only in the prediction whether the time to reach closure is slightly longer, slightly shorter, or close to the time to closure of the wild type system. This disagreement is likely due to the slightly different degree of stochasticity in the two models. The full model initializes 26 of the 80 nodes randomly (33%), while the reduced model initializes 17 of 49 nodes randomly (35%). We note that in two cases the reduced model agrees better with experimental results than the full model. For example, the reduced model predicts that NIA1/2 knockout (KO) (in boldface) leads to a close to WT sensitivity to ABA. This agrees with experiments [2], while its response category originally predicted in [1], namely hypersensitive, disagreed with experimental results. Nodes that are reduced or merged are underlined and their complete name and composition are given in Tables S2-S5.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Response category | Number of cases | Cases of node KO or CA in this response category that agree with the full model | CPC range (0-50) | Cases of disagreement with the full model |
| Hypersensitive | 9 | RCARs CA [3], TCTP CA [4], Microtubule Depolymerization CA [5,6], ABI2 KO [7,8], OST1 CA [9], ABI1 KO [7,8], PA CA [10], PLDα CA [10,11] | 44.44-44.8 | **PP2CA KO** (close to WT) [12] |
| Close to wild type | 8 | cGMP CA [13], NO KO [2], ROP11 KO [14], V-ATPase KO [15,16], cGMP KO [13] | 44.27-44.37 | S1P CA (hyper) [17-20], **NIA1/2 KO** (hyper) [2], HAB1 KO (hyper) [21,22] |
| Hyposensitive | 9 | ROP11 CA [16], QUAC1 KO [23,24], SLAH3 KO [25], V-PPase KO [15], PLC KO [26,27], PLDα KO [11], CIS KO [28,29], cADPR KO [30], InsP3/6 KO [26,27] | 41.36-44.15 |  |
| Reduced sensitivity | 15 | Vacuolar Acidification KO [15], CaIM KO [31], pHc KO [32], ABI2 CA [33], Actin Reorganization KO [34], AtRAC1 CA [35], H+ATPase CA [36], GHR1 KO [37], ROS KO [38], SLAC1 KO [39], S1P KO [17-20], PA KO [10], PP2CA CA [12], MPK9/12 KO [40], PLDδ KO [41] | 10.28-38.12 |  |
| Insensitive | 7 | RCARs KO [42,43], K+efflux KO [44], OST1 KO [45,46], KOUT KO [44], Microtubule Depolymerization KO [6], Ca2+c KO [28,29], ABI1 CA [33] | 0-0.01 |  |

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