**Protocol S2: Bifurcations in the simplified model with the new parameter values**

We provide here more details on bifurcations appearing in the simplified model (2) from the main text with the new parameter values (Additional file 10: Table S2), in a constraint part of the Bcd–Cad plane. The notations and short definitions of bifurcation types are given in Additional file 5: Protocol S1.

The parametric portrait is shown in Additional file 12: Figure S9 of Supplementary Material. We found three different types of bifurcations:

- saddle–node/saddle–saddle (fold) bifurcation (black lines in the figure),
- Hopf bifurcation (blue line), and
- cusp bifurcation (points marked by red arrows).

We can see in the figure two different types of fold bifurcations: (1) $S(1,3)$ and $S(2,2)$ annihilate each other going from region 2 to 1, 2 to 3, 9 to 7, 22 to 21, 21 to 19, 11 to 12, 11 to 10, 11 to 6, 14 to 6, 21 to 1, 22 to 2, 14 to 13, 14 to 15, 24 to 23, 24 to 25, 18 to 19, 22 to 18, 18 to 17, 16 to 17, 22 to 16, and 16 to 3, and (2) $S(1,3)$ and $A(0,4)$ annihilate each other going from region 3 to 4, 5 to 4, 6 to 5, 6 to 7, 8 to 7, 10 to 7, 11 to 9, 13 to 5, 13 to 3, 13 to 7, 23 to 13, 23 to 12, 24 to 14, 24 to 11, 25 to 15, 25 to 10, 6 to 23, and 14 to 16.

The Hopf bifurcation is associated with the change of an attractor to a saddle of type $S(2,2)$. Namely, $A(0,4)$ becomes $S(2,2)$ going from region 20 to 19.