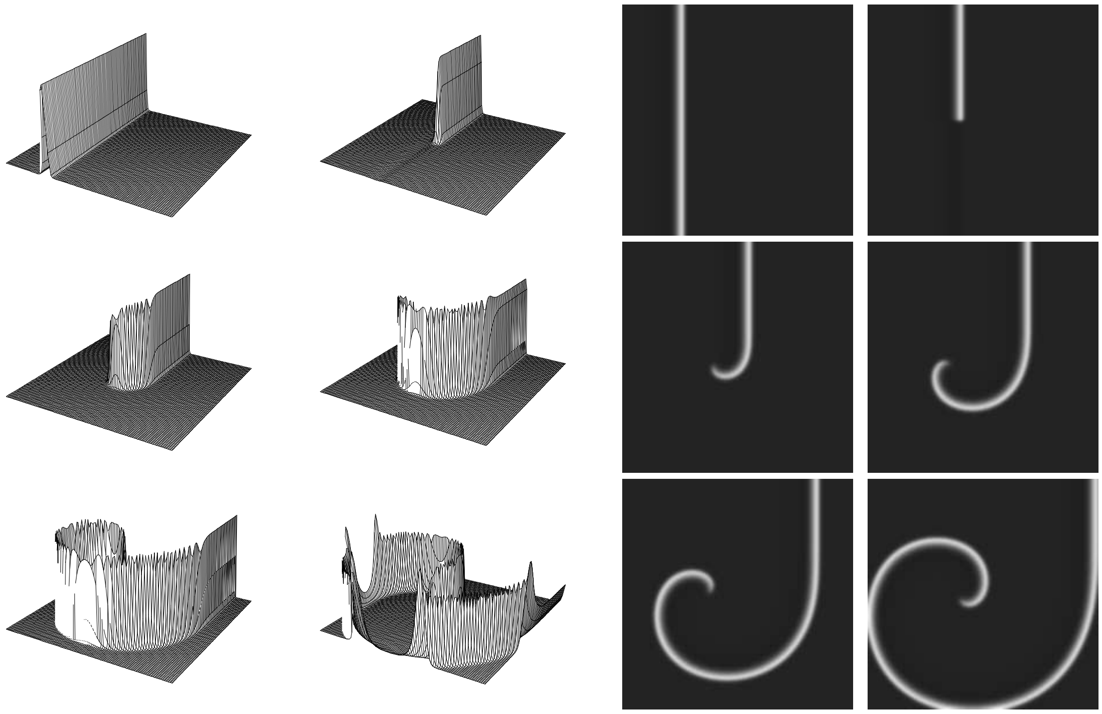

Fig. 6. Formation of a spiral. The Z-axis indicates cAMP concentration. We initiate a plane wave from the side. Later we reset one half of the plane back to the steady state values, breaking the wave. The end curves inwards and forms a spiral, as described in the text. Parameters as in Fig. 3.. The time between each frame is 20 min. $dx = 0.1$mm, $dt = 0.01$ min. 200×200 grid. The period for the spiral $T \approx 60$ min. To the right is a contour plot, where the cAMP concentration is represented in gray scale.

a) b)

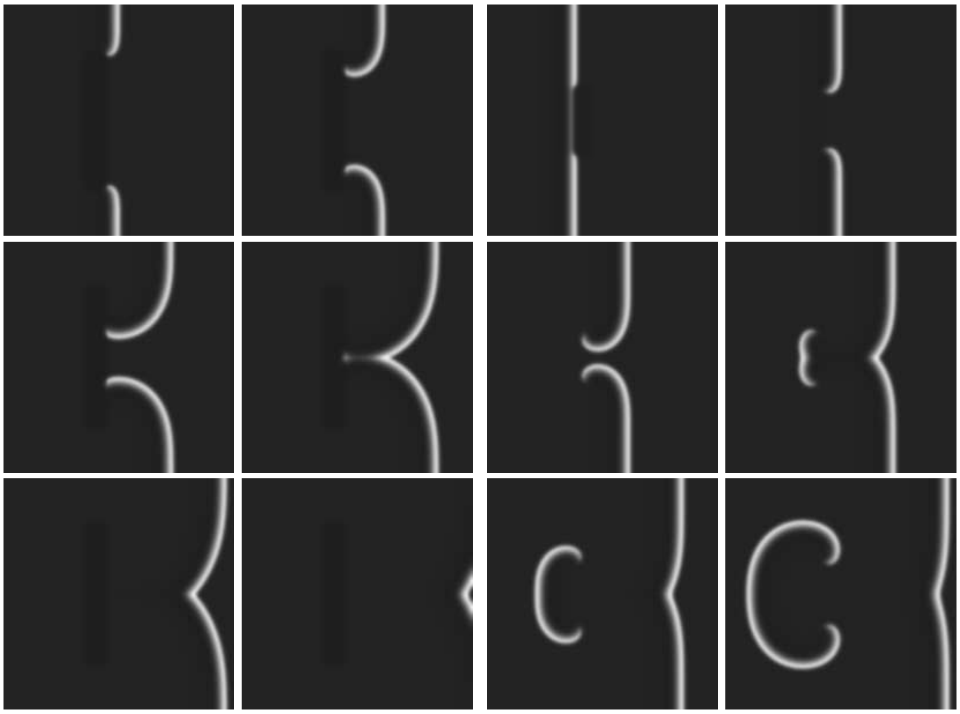

Fig. 7. a) Wave propagating past a non-excitable region. The size of the region is $2 \times 10\,\mathrm{mm}^2$, 8 min. between frames. b) Wave propagating past a temporarily non-excitable region, 2×6 mm^2, $\epsilon = 0.05$ initially, increasing by 0.0003 each time step. 16 min between frames. Other parameters as in Fig. 3. $dx = 0.1\mathrm{mm}$, $dt = 0.04$ min, 200×200 grid.

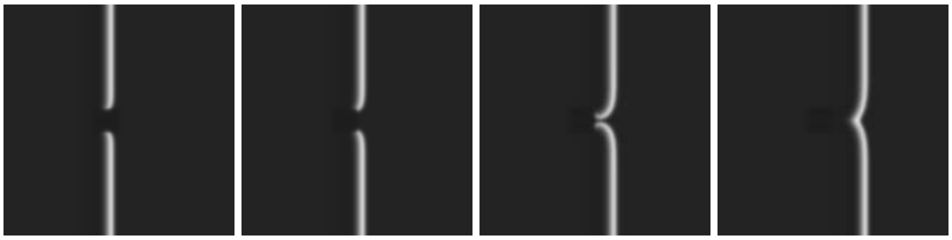

Fig. 8. Wave propagating past a temporarily non excitable region. Same as Fig. 7.b except now size of region is 2×2 mm^2, 8 min. between frames.

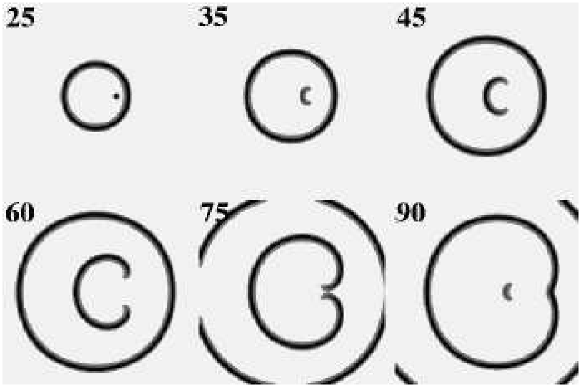

Fig. 9. Formation of a double spiral. A second pulse is initiated off-center and shortly after a circular wave has passed by. Parameters as in Fig. 3.. The numbers indicate time, $dx = 0.1$mm, $dt = 0.04$ min, 100×100 grid.

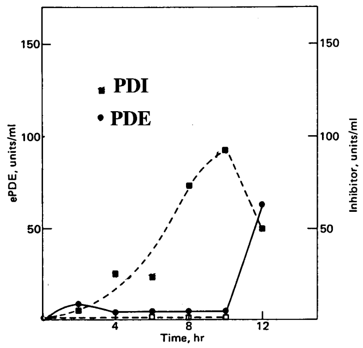

Fig. 10. *Dictyostelium* cells begin to secrete PDI shortly after the onset of starvation. From (Kessin *et al.* , 1979)

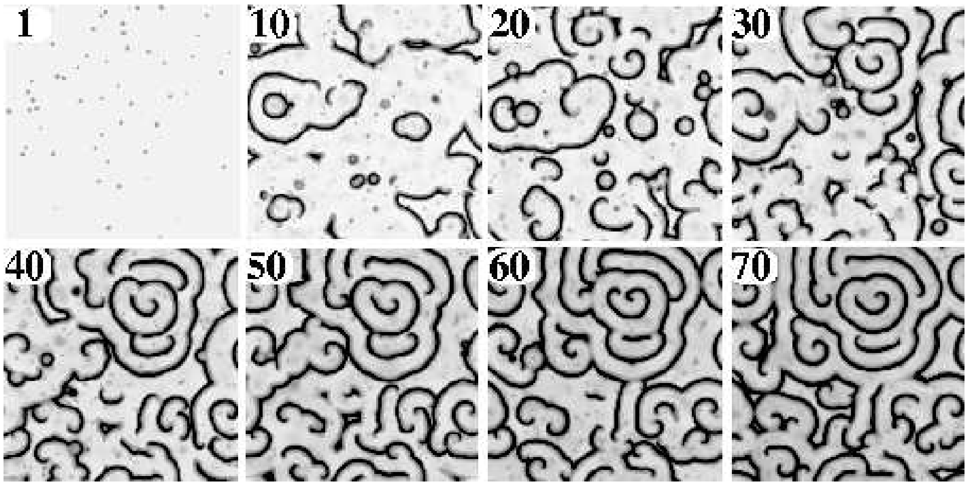

Fig. 11. Random spatial PDI secretions can account for the establishment and evolution of wave patterns. Time is given in min. Increasing PDI levels correspond to increasing background intensity, cAMP levels are in grayscale. Probability of PDI secretion $p = 0.5 \times 10^{-6}$ / timestep / cell). The diffusion constants for cAMP and PDI were $4 \times 10^{-6} cm^2 sec^{-1}$ and $8.3 \times 10^{-7} cm^2 sec^{-1}$. Grid 400×400, with $dx, dy = 0.1$ mm, dt= 0.04 min.

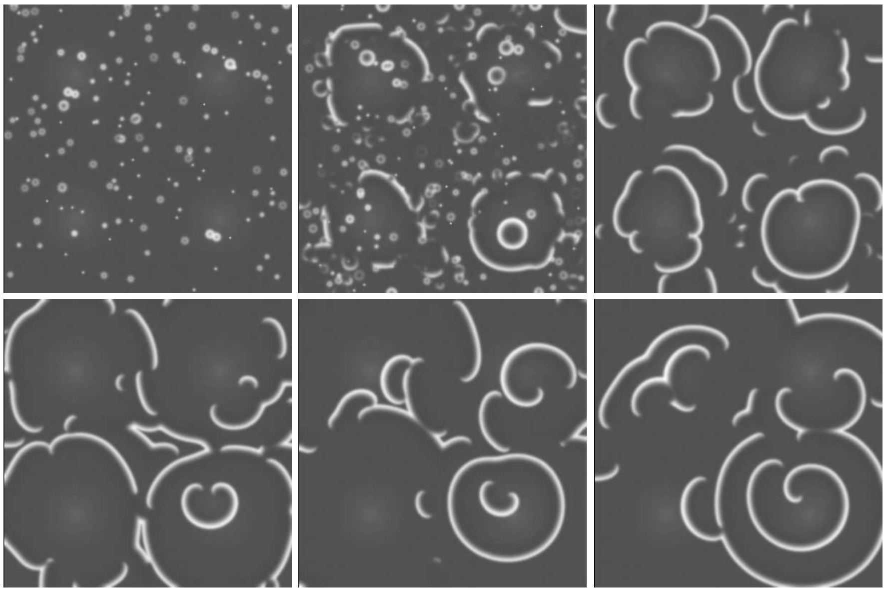

Fig. 12. We begin with random cAMP pulses. The probability of a cAMP pulse was $p = 2 \times 10^{-6}$ per grid unit per time step. We stopped initiating pulses after 2000 time steps. Parameters as before. The time between each frame is 8 min. $dx = 0.2$ mm, $dt = 0.04$ min, 200×200 grid and 4 cone shaped gradients located at $x = 100 \pm 50,\ y = 100 \pm 50$ given as $k_e = 3.58 - 0.02 \times (20 - r)$. Here r is the distance away from the center of the cone.