SUPPLEMENTAL INFORMATION

Pseudopodia perpendicular to the surface of deformed spherical bodies.

The cell is not a perfect circular body. Here we illustrate how deviations from a circle affect the angle of pseudopodia that are extended still perpendicular to that body. Assume a circle with deviations in the form of a wave. The position of the body is given in the polar coordinate system (r, θ) by

$$r(\theta) = a + b\cos(\theta/\mathrm{n}) \qquad (1)$$

where a is the radius of the circle, b is the amplitude of the wave, and n is the number waves on the circumference of the circle. To present the body in the Cartesian coordinate system (x,y), we calculated the x,y values, according to

$$x(\theta) = r\cos\theta = [a + b\cos(\theta/\mathrm{n})]\cos\theta \quad \text{and}$$

$$y(\theta) = r\sin\theta = [a + b\cos(\theta/\mathrm{n})]\sin\theta \qquad (2)$$

Figure S1A shows the bodies for the unit circle (a = 1) with b = 0.2 and different values of the number of waves n, as well as with a mixture of waves (n = 2 to 5).

We calculated the tangents at these bodies, as well as the angle α to the left of the "pseudopod" perpendicular to these tangents. Figure S1B shows the cosine of this "pseudopod" angle, which in the research field of chemotaxis is called chemotaxis index ($\cos\alpha$ = CI). The results show that pseudopodia extended at the front of the cell closest to the gradient have CI = 1. Pseudopodia extended more to the rear of the cell have a lower CI, which for a circle is linear with x-distance from the front. In bodies with a wave-like boundary, the chemotaxis index just behind the front declines faster than in a perfect circle.

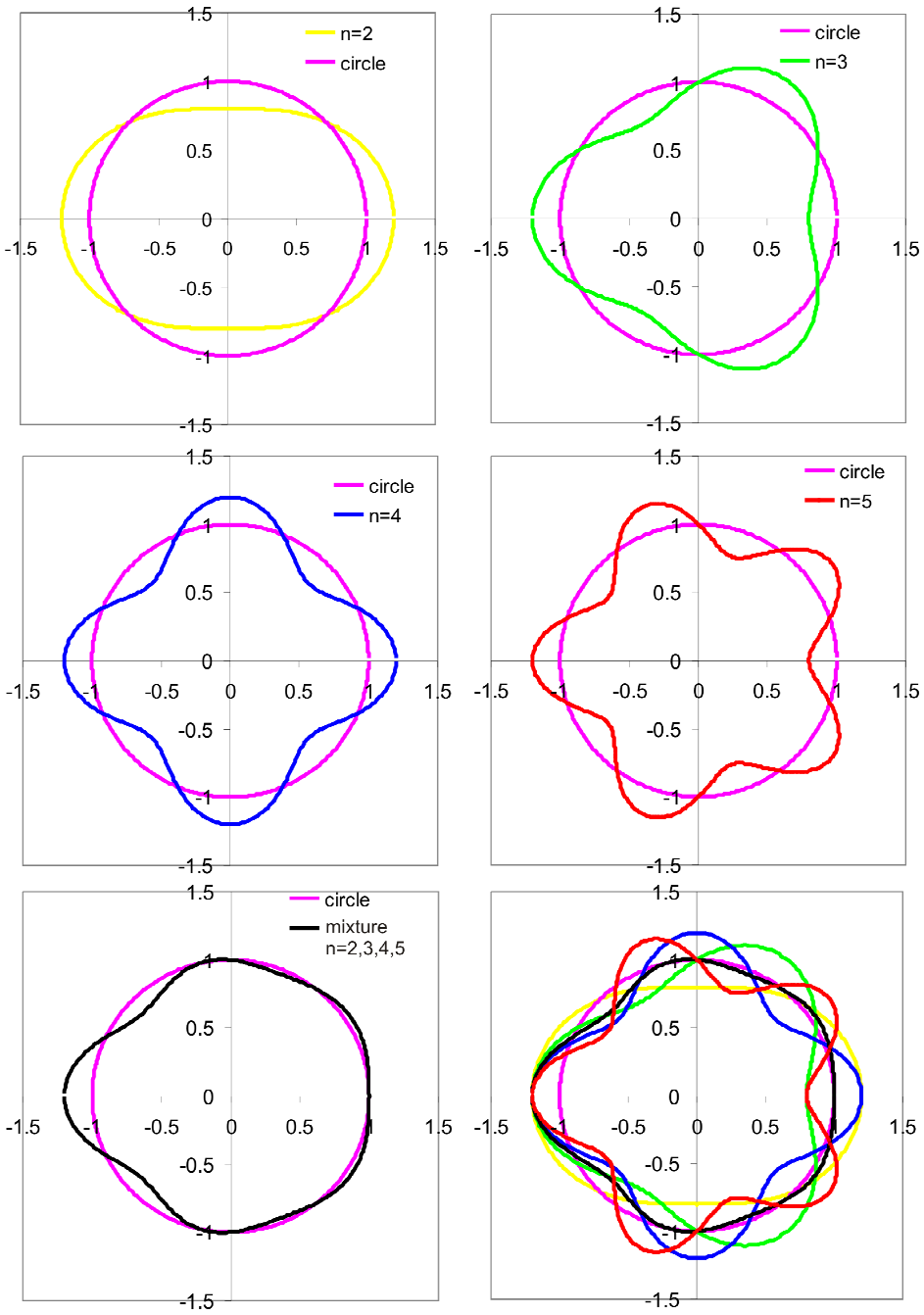

Figure S1A. Bodies of the unit circle with waves on the surface; n is the number of waves, which have an amplitude of $b = 0.2$, compared to the radius of the circle ($a = 1$). The "front" of the cell is at the left side.

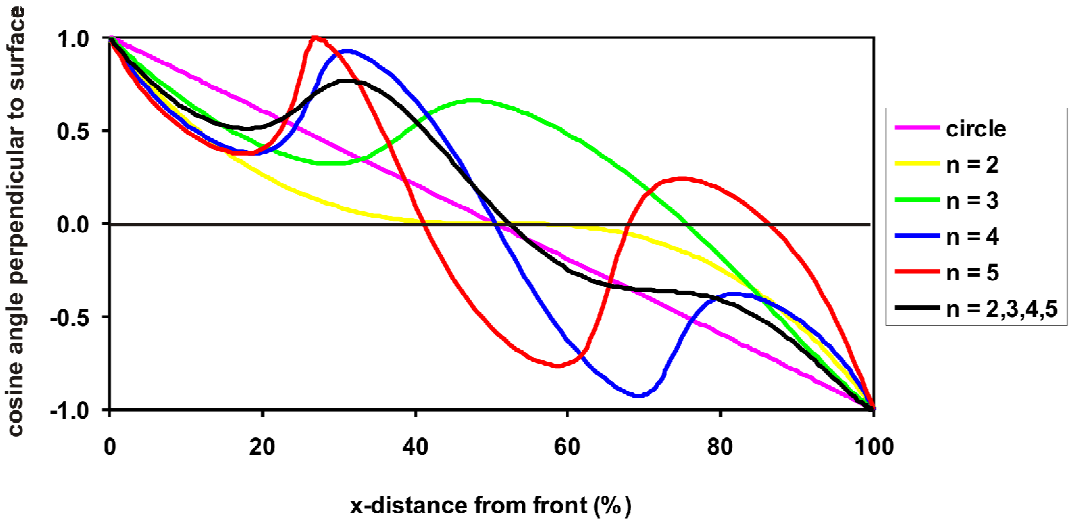

Figure S1B. The angle perpendicular to the surface of the bodies was calculated at different x-distances from the "front", which is at the left side. The cosine of this angle is presented, and is identical to the often used chemotaxis index (CI).