

CHAPTER 10

INTELLIGENT DESIGN

ION CHANNELS: AN EXAMPLE OF HOW COMPLEXITY COULD EVOLVE

I on channels provide another example of how something complex might evolve. An ion channel is a biochemical structure that allows ions to move between the inside and the outside of a cell. It is not just a hole in the cell wall; it's a protein gate that allows only particular ions to pass through and blocks all other ions and molecules. Moreover, the channel can be open and shut as needed, under the control of neurotransmitter chemicals, electrical voltage, or regulator proteins.

Imagine that a gene makes a protein we'll call channel-A. Four copies of channel-A, arranged in a ring, make a functioning ion channel. This channel works without a regular protein, but it works even better when another protein we'll call regulator-1 is attached to one of the copies of channel-A.

Now imagine the gene for channel-A duplicates, creating a second gene we'll call channel-B. At first the proteins channel-A and channel-B are identical and interchangeable, so any combination of four of them will make a functioning ion channel. After a while channel-B mutates several times until regulator-1 can no longer attach to it. But now regulator-2 (a protein that is fairly similar to regulator-1 but is made by a different gene) can attach to channel-B. This situation is advantageous because now any ion channel that has copies of both channel-A plus and channel-B can be regulated by both regulator-1 and regulator-2, so channel functions can be controlled in more ways.

Now the gene for channel-A duplicates again, creating the gene channel-C. It goes through a similar mutation process. It's still true that four copies of the channel-A protein make a functioning ion channel. But the best functioning ion channels are made by combining two copies of channel-A and one copy each of channel-B and channel-C. So while the best-functioning ion channels are more complex than the original ion channel, they are not yet irreducibly complex.

At this point it might happen that a mutation in channel-A will cause it to function even better in cooperation with channel-B and channel-C, but there is a cost—after the mutation, four copies of channel-A by themselves no longer make a functioning ion channel. This mutation would still be advantageous for the organism because it had long ago stopped bothering to make ion channels out of just four copies of channel-A. The ion channel is now, just barely, irreducibly complex. It is made of two copies of the channel-A protein and one copy each of channel-B and channel-C. If any one of these three genes is destroyed, the organism cannot make a functioning ion channel. This irreducibly complex ion channel evolved in a simple, step-wise fashion, using only well known mechanisms of evolution.

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Even though this story is just an illustration of how something complex could evolve, several ion channels are known to exist in which the genes look very much like they did evolve in this way. These ion channels are fairly strong scientific evidence, not just speculation, that biological complexity can and did evolve in some cases.