THE STEPS FROM GRADED POTENTIAL TO ACTION POTENTIAL

1. Pressure opens mechanically gated channels of the pacinian corpuscle allowing sodium ions to flow into the cell.
2. The influx of sodium causes a depolarization (graded potential) on the membrane of the pacinian corpuscle.
3. This depolarization (graded potential) activates (opens) voltage gated sodium channels. The opening of the voltage gated sodium channels causes a large influx of sodium. The large influx of sodium causes the depolarization (graded potential) to increase in strength as it spreads toward the axon hillock.
4. If the graded potential (depolarization) is large or great enough that it reaches a threshold point, an action potential will be generated at the axon hillock. The axon hillock is a special area of the neuron which has many many many voltage gated sodium channels. The number of voltage gated channels opening in response to the graded potential is what drives or generates the steep depolarization. This steep depolarization is an all or nothing change in membrane potential.
5. Once the depolarization (action potential) reaches +30mv the voltage gated sodium channels inactivate while voltage gated potassium channels open. The combined inactivation of the voltage gated sodium channels and opening of the voltage gated potassium channels causes a rapid repolarization of the membrane.
6. If too many voltage gated potassium channels open, the membrane potential will become more negative, overshooting resting membrane potential (hyperpolarization).
7. Hyperpolarization causes voltage gated potassium and voltage gated sodium channels to close. This allows the sodium potassium pump to restore the membrane to resting membrane potential.
8. The inactivation of the voltage gated sodium channels in step 5 causes the depolarization to spread in a forward motion down the axon. When the voltage gated sodium channels inactivate, they prevent the depolarization from moving in a backward motion. This is called continuous propagation.