MODULATION OF PRIMARY COUGH AFFERENT DRIVE – COMPUTER SIMULATIONS

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The simulations of changes in primary cough afferent drive were performed on the computer breathing / cough model. Either the number of fictive afferent terminals or the number of fictive driving neurons were modified.

Simulated reduction of the number of axonal terminals to 50% and 25% resulted in cough suppression, the cough number decreased to 56% ($p > 0.05$) and 24% ($p < 0.001$), respectively. Lower number - 50% and 25% of neurons in driving populations also diminished coughing, disproportionally decreased cough number to 68% ($p > 0.05$) and 53% ($p < 0.05$), respectively.

Experimentally performed unilateral vagotomy or unilateral vagal cooling on anesthetized, spontaneously breathing cats resulted in obvious cough suppression consistently with our simulations. However, the extend of reduction in cough number during the experiment is apparently different from that during the simulations.