Breathe In, Breathe Out

Simon Fraser University

Although mechanical ventilation can be a life-saving intervention for patients who are unable to breathe effectively on their own, automated breathing machines often put patients at risk for infection, pneumonia and death. After just a few days on a ventilator, the respiratory muscle becomes weakened, making it difficult for patients to be weaned from the machine and regain the ability to breathe independently. When a critically ill patient becomes ventilator-dependent, the risk of dying increases seven-fold.

To combat the rapid and profound atrophy of the diaphragm in patients with respiratory failure, Dr. Joaquin Andres Hoffer and his team at Simon Fraser University (SFU) worked relentlessly over the past decade to develop a neurostimulation system designed to exercise and strengthen the diaphragm muscle, the main muscle used for breathing.

"I watched patients struggle to wean from the ventilator," says Dr. Joaquin Andres. "I realized that electrical 'pacing' could help patients regain muscle strength and endurance."

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> *While Dr. Hoffer and his team conducted extensive pre-clinical market research on the new device called the Lungpacer Diaphragm Pacing System (DPS), the SFU Innovation Office developed a strategic business plan and an intellectual property portfolio for the invention.*

The spinout company called Lungpacer Medical, Inc. received an Expedited Access Pathway (EAP) designation for the DPS from the U.S. Food and Drug Administration (FDA), becoming the first Canadian company to win approval through the program designed to facilitate rapid patient access to breakthrough technologies.

Dr. Hoffer credits the support and expertise of the SFU Innovation Office. "Their help was essential to us obtaining key grants and the initial investment that allowed the company to hire an experienced management team, move into its own premises and finally start flying solo."

A crucial grant from the Canadian Institutes of Health Research made it possible to conduct feasibility trials with 24 mechanically-ventilated patients. The promising trial results may one day lead to faster recoveries and lowered hospitalization costs as patients begin breathing easier.

This story was originally published in 2015.

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