



respinova

Breathe Well,
Live Well™



Co-funded by the Horizon 2020 SME and EIC
Pilot programmes of the European Union

Close to Market

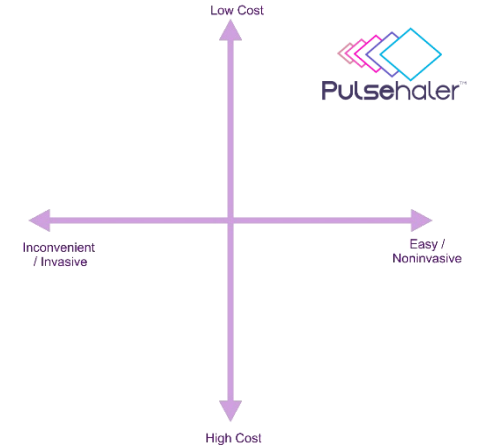


Huge Unmet Need



€200B+

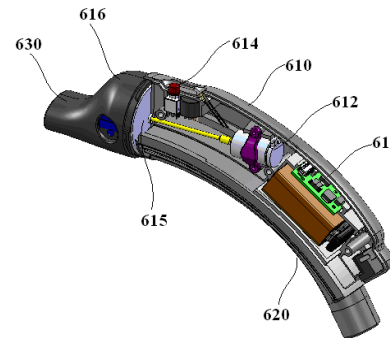
Unique Market Position



Experienced Team



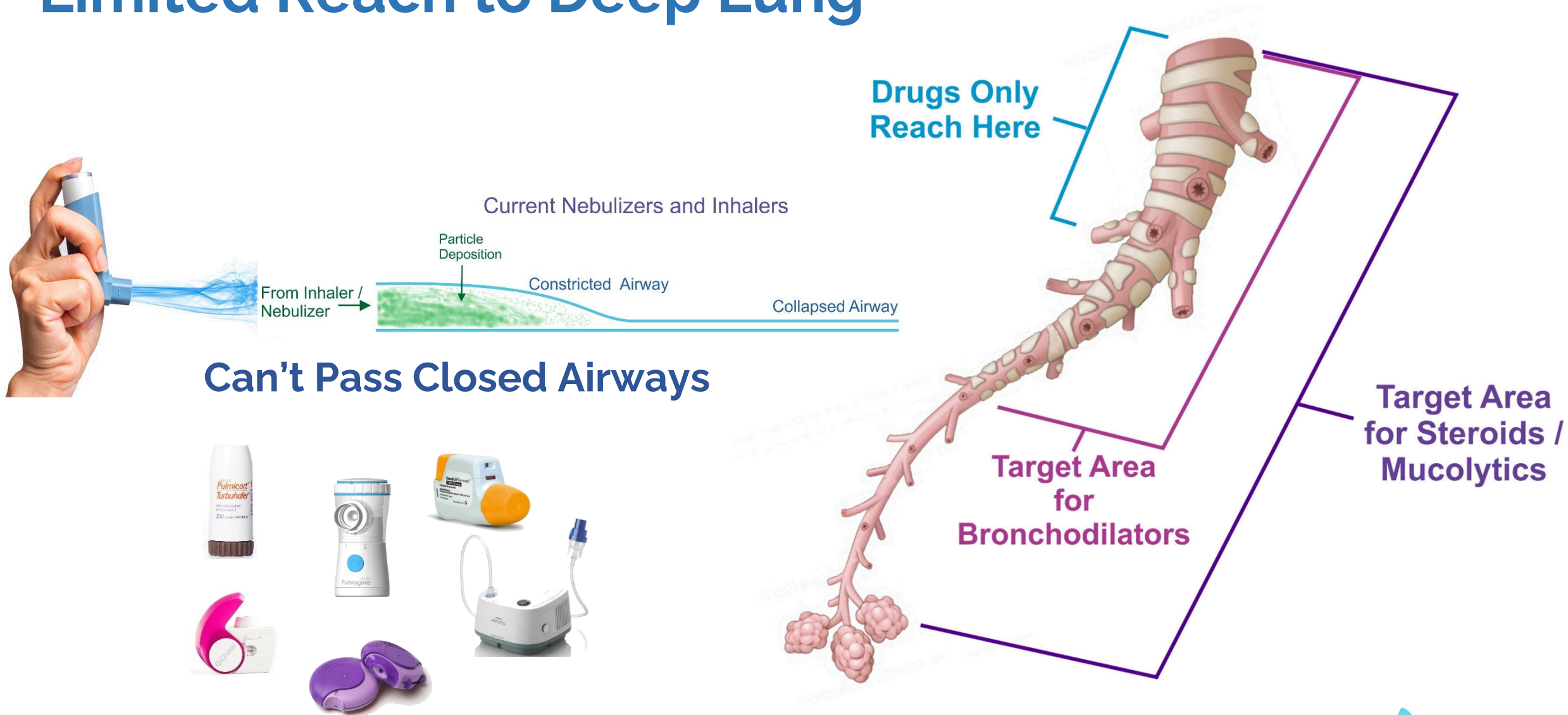
Strong Broad IP



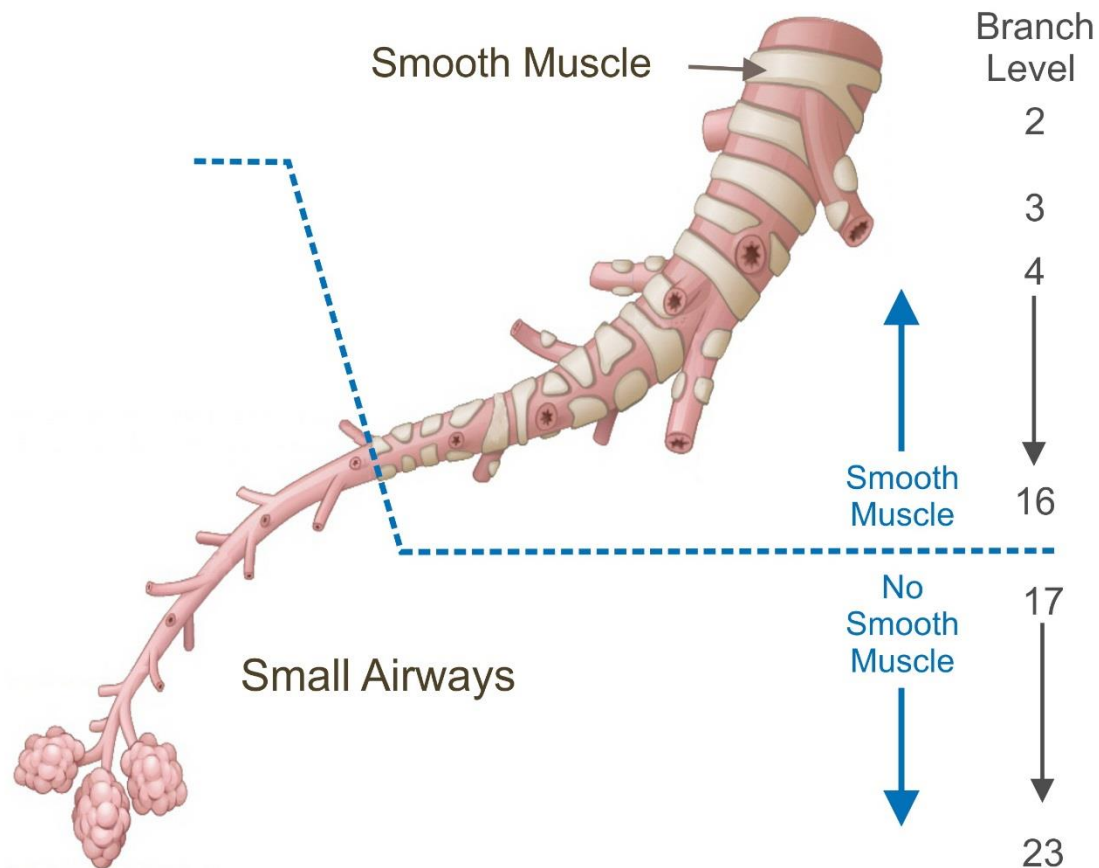
Disruptive Pipeline



Issues with Drug Therapies: Limited Reach to Deep Lung

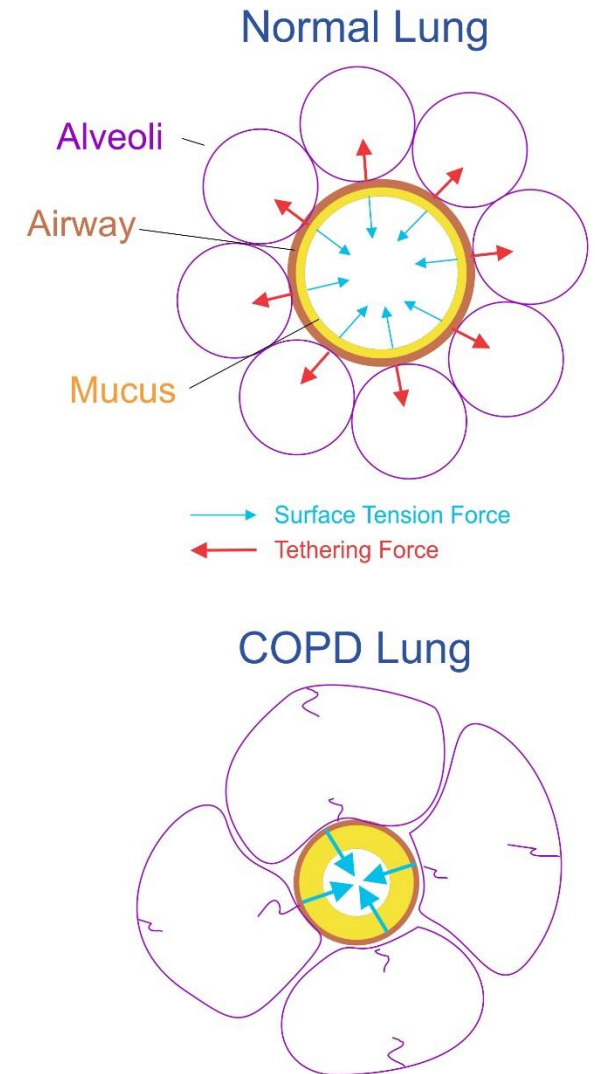


Addition Issues in COPD: Small Airway Collapse not Addressable by Drugs



Upper airways can be
constricted by
muscle...

Small Airways are
collapsed by internal
forces which cause
them to close...
and keep them closed.



1. COPD Problem:
Drug Therapy can't reopen
collapsed small airways



Solution:
Pulsehaler™ directly
reopens collapsed small
airways

2. Drug Delivery Problem:
Drugs can't reach their
targets deep in the lung



Solution:
Pulsehaler™ DD delivers
drugs while opening
airways = deeper delivery

Pulsehaler™ Technology Solves BOTH!

Pulsehaler™ Technology Platform

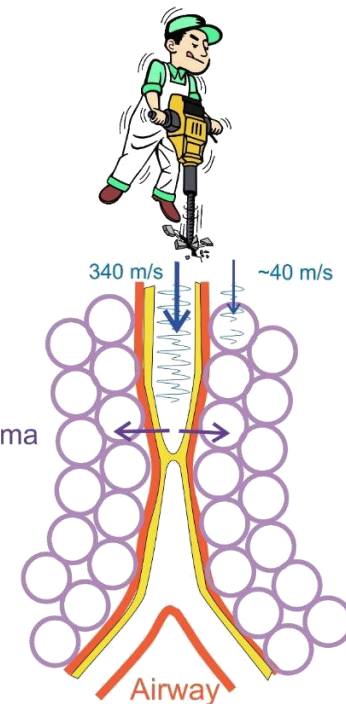
Dynamic Air Pressure Pulse Therapy

- Proprietary Waves, Frequencies, Pressures
- Independent of Drugs



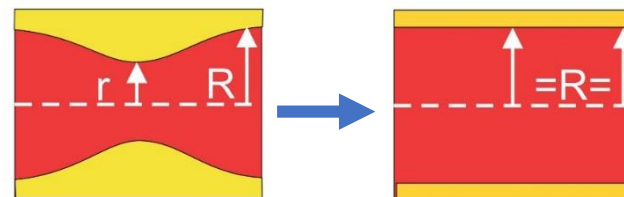
(1) Re-Opens Airways

- $P_{\text{Airway}} > P_{\text{Parenchyma}}$
- Transmural Pressure Changes = "Gentle Jackhammer" Effect



(2) Changes Mucus Viscosity

- Liquify thick mucus & spread it
- Thixotropy = "Ketchup bottle" Effect



Initial Launch Product: Pulsehaler™ (non-drug) For COPD

Direct Healthcare Cost
\$200B+



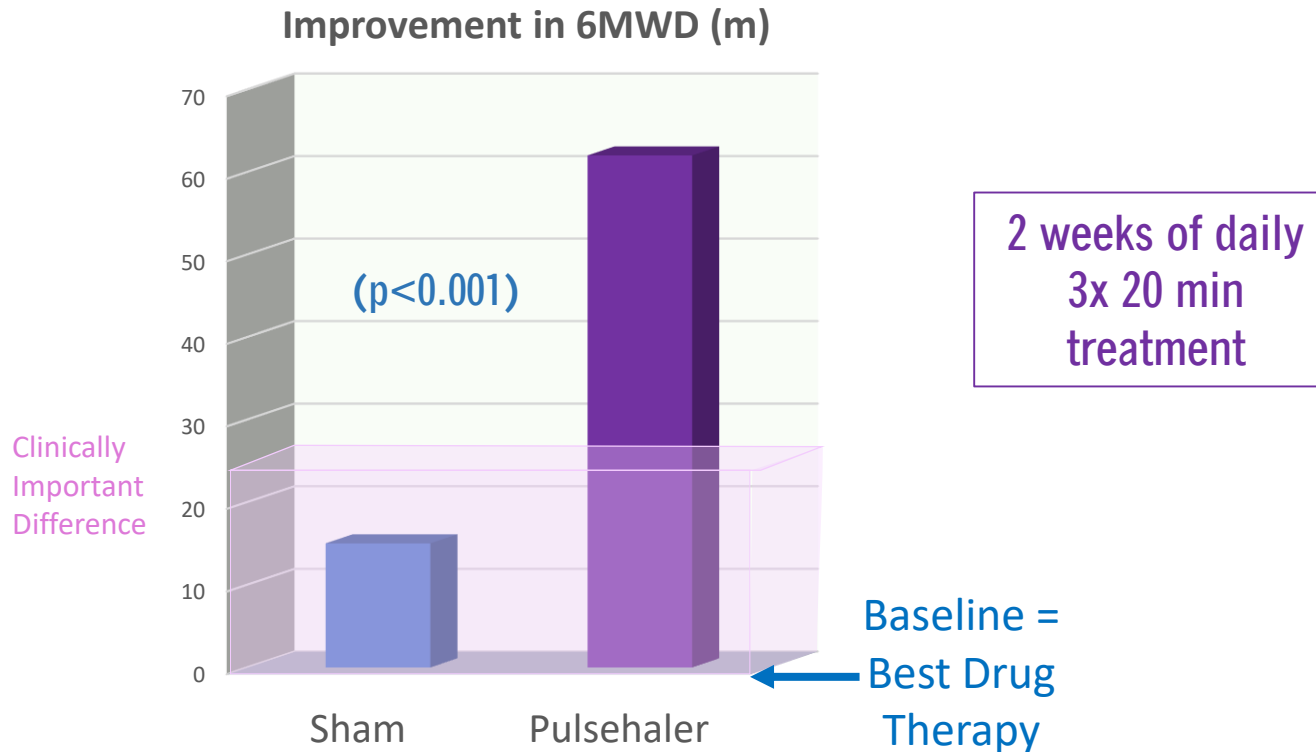
COPD (Chronic Obstructive Lung Disease)
>350 Million Patients and Growing
#3 Killer of all Diseases

Clinically Proven in COPD

ORIGINAL RESEARCH

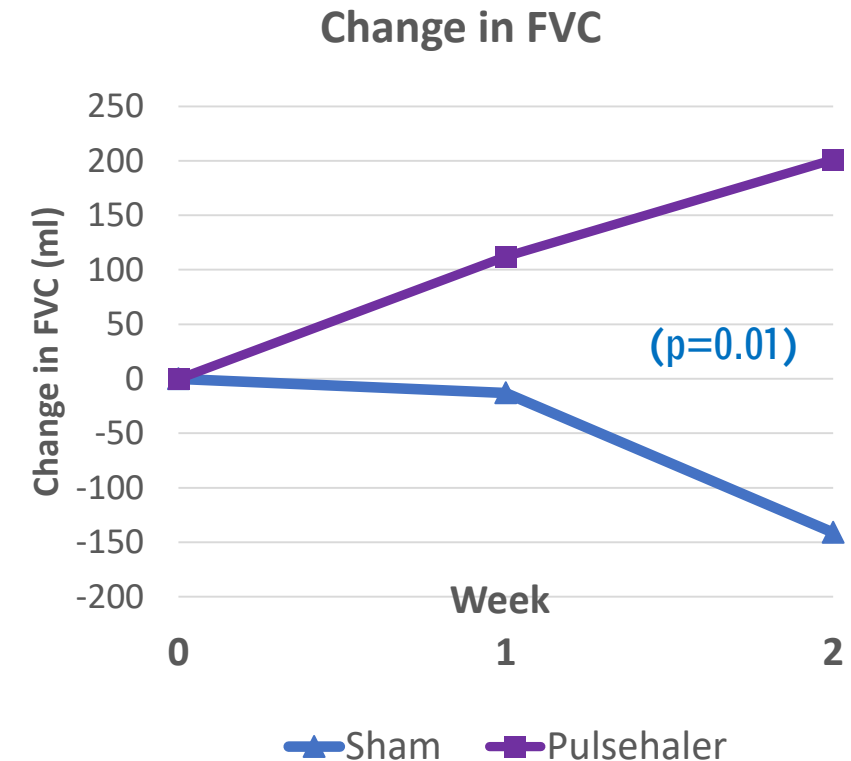
Randomized Controlled Crossover Trial of a New Oscillatory Device as Add-On Therapy for COPD

Zvi G. Fridlender,¹ Nissim Arish,¹ Uri Laxer,¹ Neville Berkman,¹ Allon Leibovitz,² Gershon Fink,³ and Raphael Breuer¹



Exercise Capacity: 2.5x the “Clinically Important Difference”

COPD JOURNAL OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE
COPD, 9:1–8, 2012
ISSN: 1541-2555 print / 1541-2563 online
Copyright © Informa Healthcare USA, Inc.
DOI: 10.3109/15412555.2012.748625



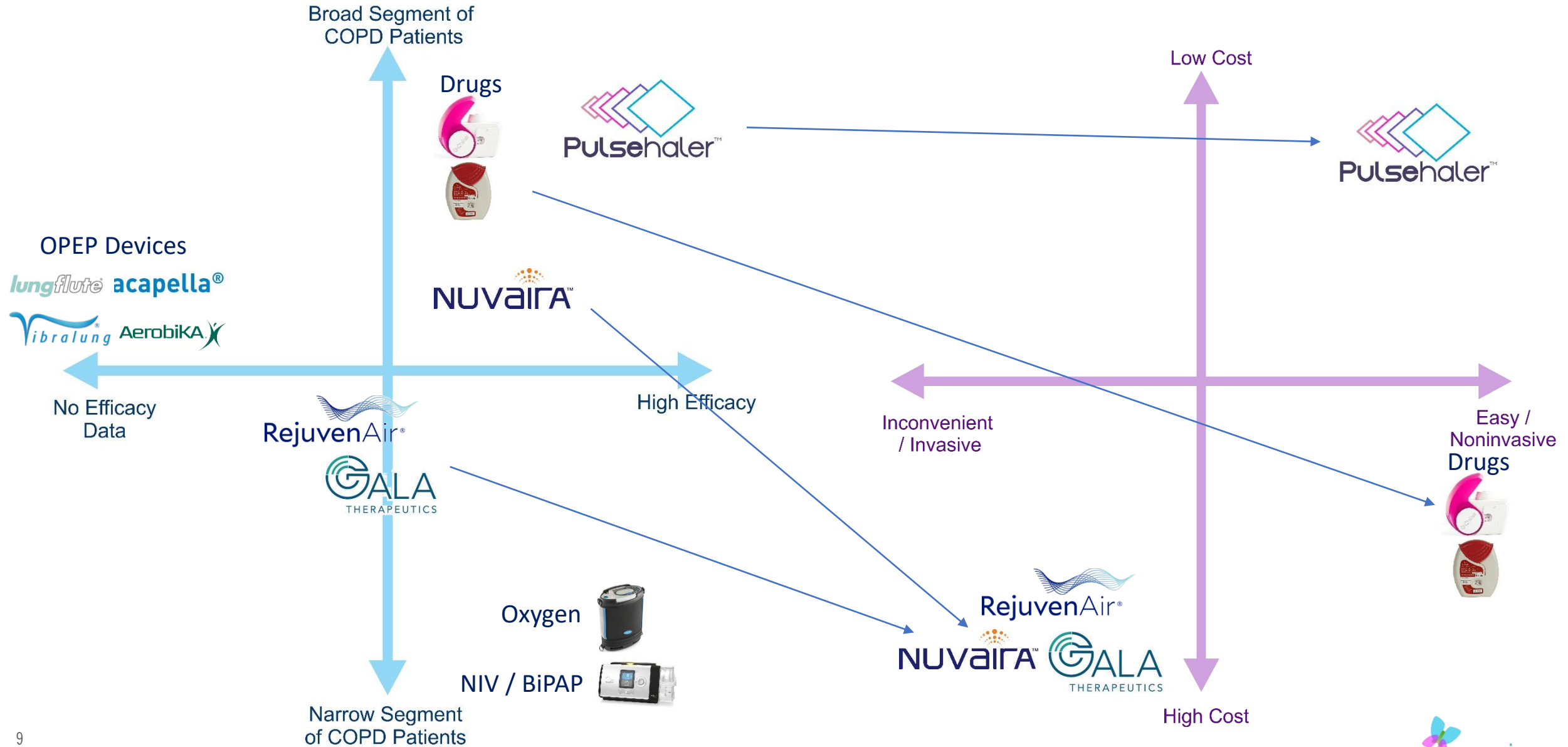
FVC change vs placebo (sham) of 342 ml

Improved Quality of Life Scores! ($p = 0.02$)

COPD Treatment Landscape



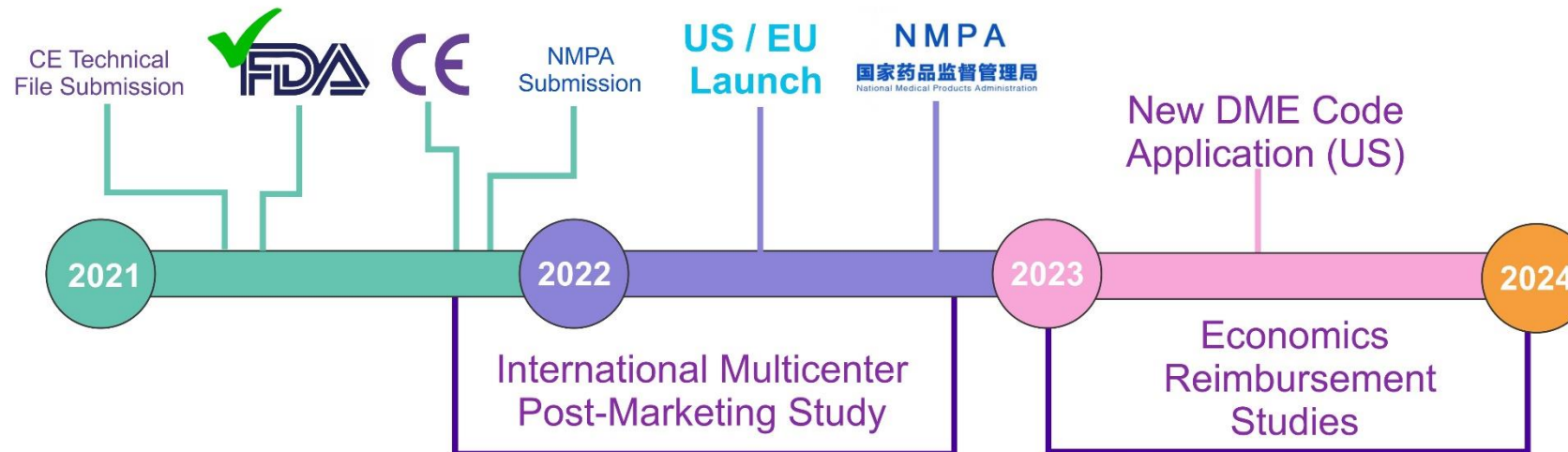
Pulsehaler™ For COPD



Business Model and Commercial Timeline

Pulsehaler™ For COPD

- FDA 510k Cleared / CE in Process
- Business Model: Sell systems and Consumables
- Hospital / Clinic Use and Home Use (Daily Therapy)
- Seeking Distribution Partners Globally
- JV Agreements with Vincent Medical for China / Japan



Breakthrough in the \$36B Drug Delivery Market

Respinova is developing a next
generation Drug Delivery platform
based on its patented Pressure
Wave technology

Pipeline: Drug Delivery Devices



Pulsehaler™ Jet



Pulsehaler™ Neb
Pulsehaler™ DPI



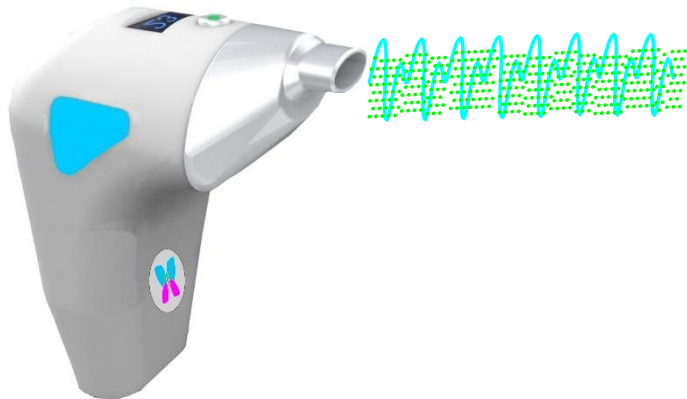
Proprietary pressure pulses + low-pressure
airstream — Opens Airways



Pulsehaler deposits drug particles deep in the
lung

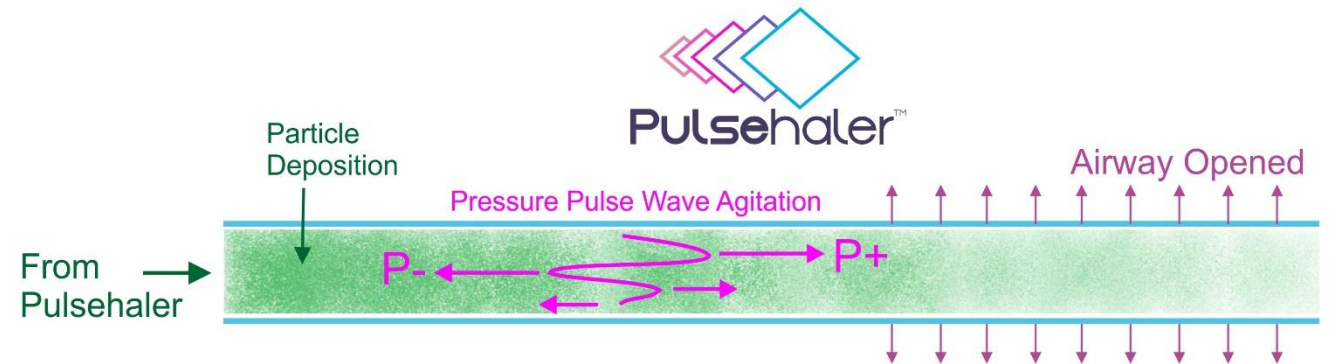
Improved Particle Delivery Mechanisms

- **Airway reopening** - allows drug penetration deeper into the small airways
- **Mucus smoothing** - smoothing of the airways mucus lining which decrease flow disturbance and tendency to re-close
- **Effect on aerosol aerodynamics** – the sharp pressure pulsations retard gravitational sedimentation of the larger aerosol particles, keeping them longer in the flow of air into the lung periphery.



Pipeline Products: Pulsehaler™ for Drug Delivery

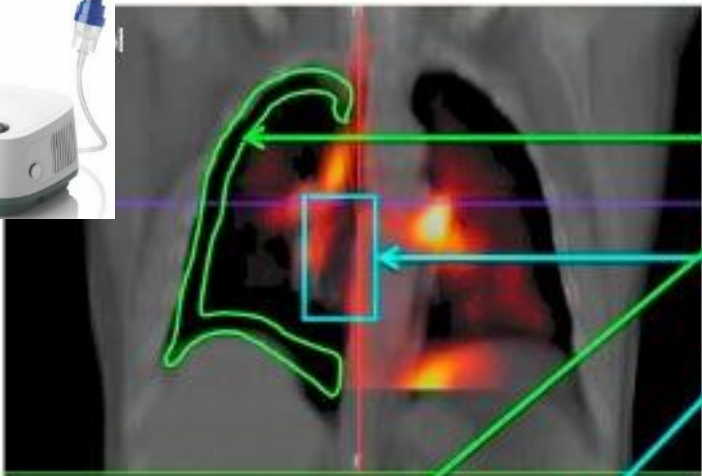
Current Nebulizers and Inhalers



Pulsehaler™ Improves Deep Lung Drug Delivery

Pulsehaler™ had 3x the peripheral penetration ratio after only 1 treatment

Standard Nebuliser



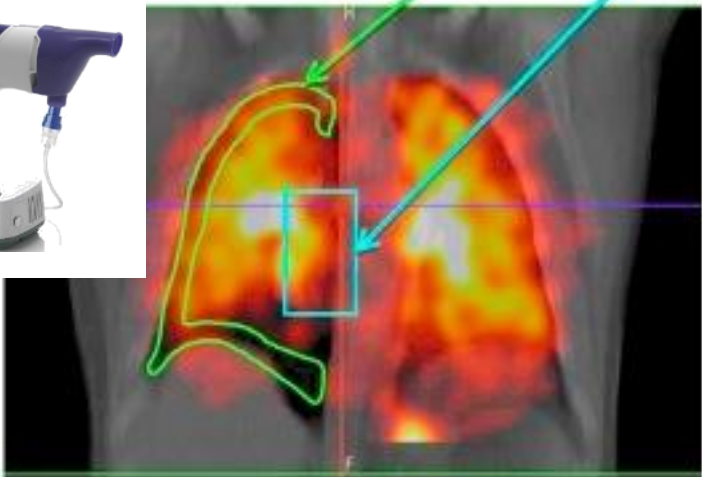
Peripheral zone

Central zone

Penetration Index (PI) =
Peripheral Zone / Central Zone



Gavriely et al 2021



	PulseHaler + Neb	Control (Neb only)	PulseHaler Vs. Control
	Mean ± SE	Mean ± SE	P
Penetration Index	0.30 ± 0.07	0.12 ± 0.03	0.0257
Penetration Index Factor = 308±67%			

Nebuliser + Pulsehaler™



PulseHaler™ Improves Drug Efficacy

Pulsehaler™ for Drug Delivery

Spirometry Results



One Treatment of 20 Minutes!

Measure	Pre-SABA	Post-SABA	Diff	Pre-SABA + PH	Post-Saba + PH	Diff
FEV1 [L]	1.483	1.549	.066 (p=NS)	1.419	1.569	.151 (p = .008)
FEV1%	54.2	56.6	2.4 (p = NS)	51.8	57.0	5.2 (p=.005)
FVC [L]	2.975	3.121	.145 (p=NS)	2.841	3.079	.238 (p<0.02)
FEF ₂₅₋₇₅	.739	.746	.007 (p=NS)	.672	.802	.13 (p<0.02)
BORG Scale	2.1	1.3	-0.8 (p=.001)	2.2	0.6	-1.6 (p=0.00002)

Drug Delivery Platform Proposition

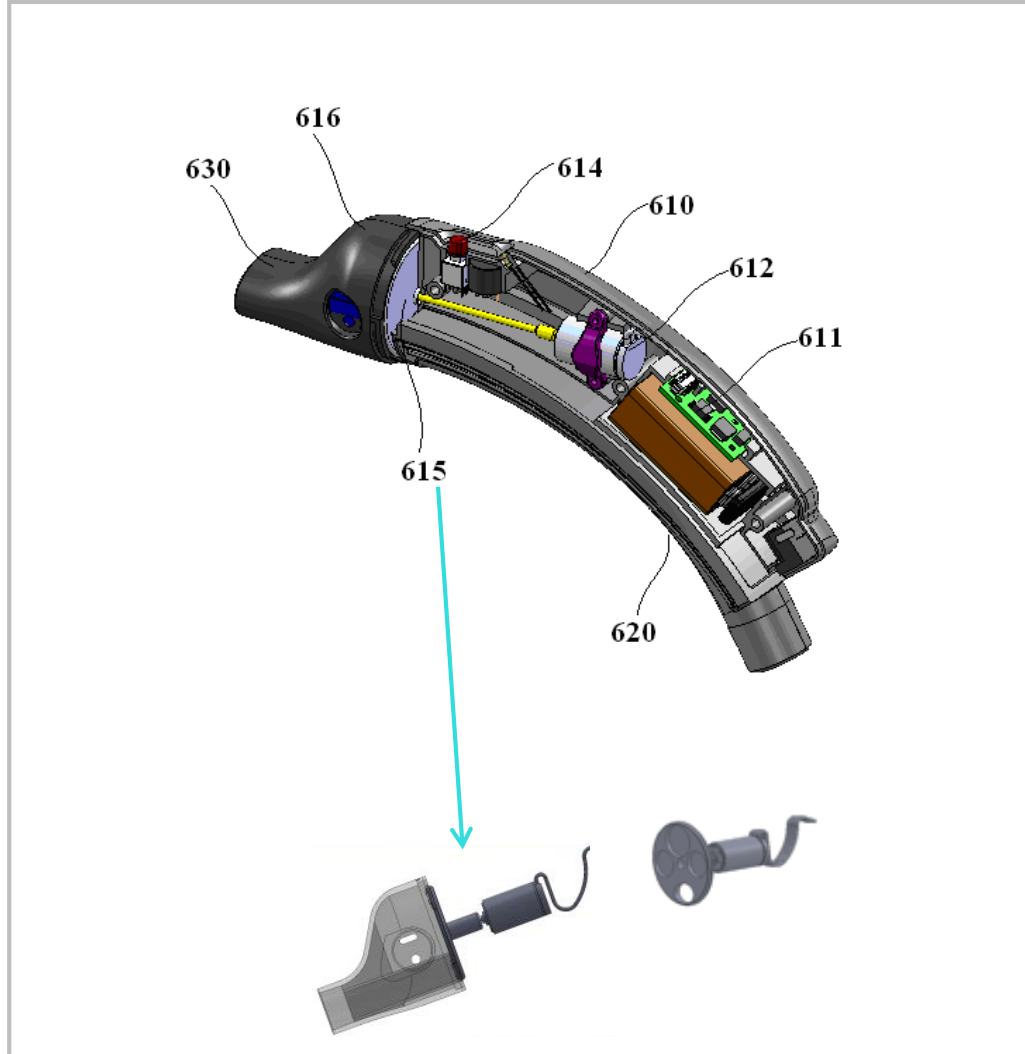
Pulsehaler™ for
Drug Delivery



Strategy:

- 1. Platform Technology for Multiple Products**
- 2. Partner for Co-Development**

Intellectual Property



- 6 patent families with 24 applications filed covering device, methods, protocols
- 17 patents granted in Europe, US, Canada, Eurasia, Israel and China
- USA, Europe, China, Japan, Canada and Israel, India
- Encrypted Pulse Frequency / Pressure Protocol Software

“Respinova's IP is a highly grantable monopoly encompassing a device for producing controlled combinations of periodic sequences of pressure pulses (BURSTS OF AIR, or AIR PACKETS) in any sequence. The device provides any protocol, characterized by the sequence, pressure, oscillations, vibrations, amplitude and intensity of the train or trains of air packets. These are provided to physiological tissues to bring about a therapeutic effect and/or to facilitate drug delivery for the relief of lung diseases.

”



Dr Eyal Bressler
Respinova IP Counsel

Team with Over 125 Years Experience

Core Team



Cliff Ansel
CEO



Yuval Avni
CTO & Founder



Lilach Bar-El
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Drew Miller
VP SW/Elec Eng.



Rachel Behar
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Ran Amos
Director of Quality



Ariella Ascher
Clinical Coordinator

Scientific Advisors



Dr. Barry Make,
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Dr. Richard
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Prof. Gershon Fink,
Kaplan Hospital



Dr. Donald Tashkin,
UCLA

Business Advisors



John Lipman
Respiratory
Marketing Expert



Florence Joffroy-Black
Device Marketing Exec



Seema Chaturvedi
Capital Markets /
Entrepreneur



Jens Spiel
Respiratory
Marketing Expert

Directors



Dr. Eddo Dinstein, LLB, SJD
Director and Founder



Hans Bocker
Director and Founder



Otto To
Director

Series B: €10M



- European Commission EIC / EIB committed investment of €5M as part of Horizon 2020 EIC Pilot Win
 - Seeking of €5M Lead Investor
- First Tranche of €1.7M via Convertible Note (€850K from EIC)
 - Seeking balance of €850K
- Use of Series B Funds:
 - Complete CE Mark
 - Multicenter Clinical trial
 - Production Rampup
 - Pulsehaler™ Launch in Europe , USA
 - ❖ plus Japan and China via Strategic Partner



Two Time Horizon Winners
H2020 SME Phase II + EIC
Pilot



Winners – Startup.Battle



Finalists



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Herzliya, Israel



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