



# Novus | Corporate Presentation

# Forward-Looking Statements

---

This presentation contains forward-looking statements that involves substantial risks and uncertainties. Any statements about the company's future expectations, plans and prospects, including statements about its strategy, future operations, development of its product candidates, and other statements containing the words "believes," "anticipates," "plans," "expects," "estimates," "intends," "predicts," "projects," "targets," "could," "may," and similar expressions, constitute forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, although not all forward-looking statements include such identifying words. Forward-looking statements include, but are not limited to statements regarding: expectations regarding the timing for the commencement and completion of product development or clinical trials; the rate and degree of market acceptance and clinical utility of the company's products; the company's commercialization, marketing and manufacturing capabilities and strategy; the company's intellectual property position and strategy; the company's ability to identify additional products or product candidates with significant commercial potential; the company's estimates regarding expenses, future revenue, capital requirements and needs for additional financing; developments relating to the company's competitors and industry; and the impact of government laws and regulations.

Actual results may differ materially from those indicated by such forward-looking statements as a result of various important factors, including: the ability to develop commercially viable product formulations; the sufficiency of the company's cash resources; the ability to obtain necessary regulatory and ethics approvals to commence additional clinical trials; whether data from early clinical trials will be indicative of the data that will be obtained from future clinical trials; whether the results of clinical trials will warrant submission for regulatory approval of any investigational product; whether any such submission will receive approval from the United States Food and Drug Administration or equivalent foreign regulatory agencies and, if we are able to obtain such approval for an investigational product, whether it will be successfully distributed and marketed. These risks and uncertainties, as well as other risks and uncertainties that could cause the company's actual results to differ significantly from the forward-looking statements contained herein, are discussed in our annual report on Form 10-K for the year ended December 31, 2018 and other filings with the SEC which can be found at [www.sec.gov](http://www.sec.gov). Any forward-looking statements contained in this presentation speak only as of the date hereof and not of any future date, and the company expressly disclaims any intent to update any forward-looking statements, whether as a result of new information, future events or otherwise.



# Corporate Profile



## Pediatric and Otolaryngology focus

Developing products for patients with disorders of the ear, nose, and throat (“ENT”)



## First-in-class treatment

OP0201 is a novel, surfactant-based drug-device product being developed for otitis media



## Two platform technologies

Clinical-stage specialty pharmaceutical company with surfactant (OP02xx) and foam (OP01xx) technologies



## Large market opportunity

Global incidence of 700+ million otitis media cases annually, with no approved drug products



## Experienced management team

Track record of successfully developing products and creating value (Allergan, Avanir, Intermune, Questcor)



## Near-term OP0201 milestones

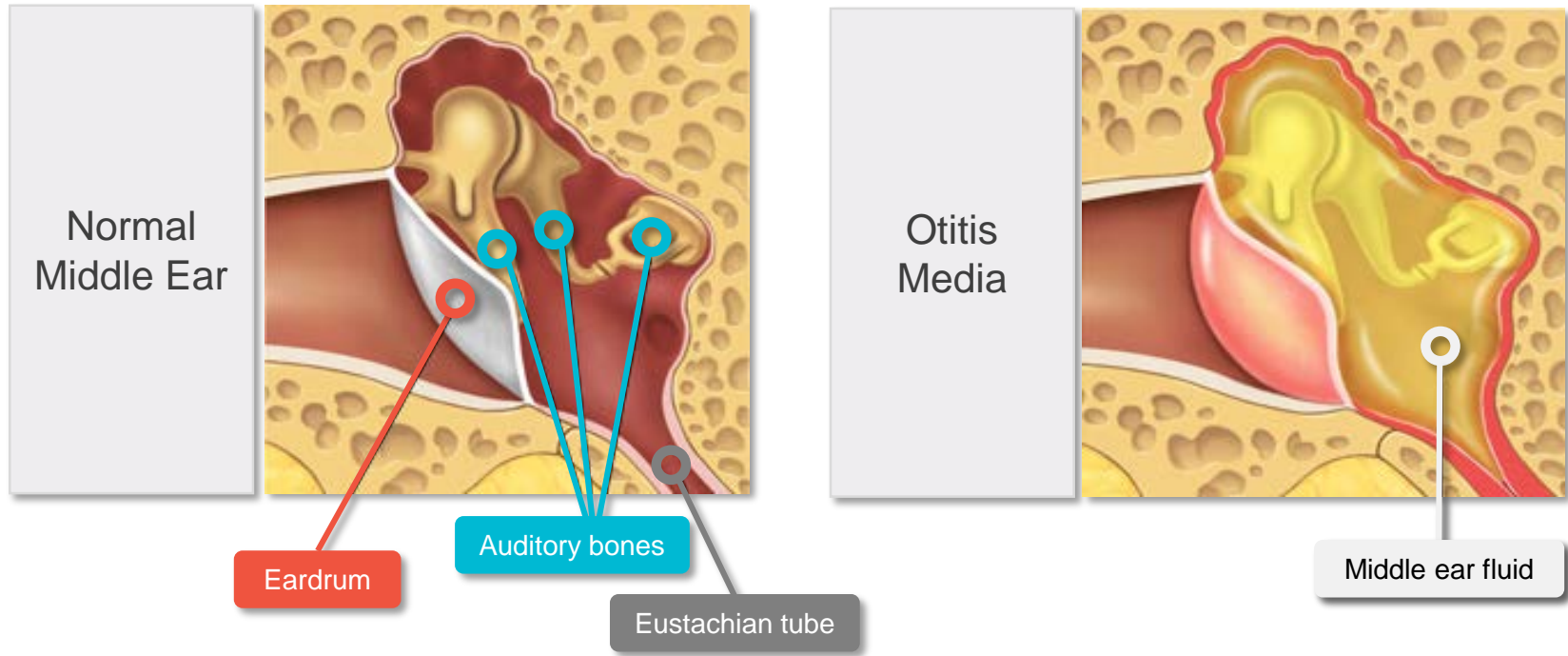
FDA meeting in Q3 2019 for OME program and data from ongoing phase 2a AOM study in 1H 2020





Otitis Media

# Pathophysiology of Otitis Media





# Definitions of Otitis Media

## Acute Otitis Media (AOM)

*Inflammation and effusion of the middle ear with signs and symptoms of infection (pain, fever, bulging eardrum, etc.)*

— day(s) —

## Otitis Media with Effusion (OME)

*Inflammation and effusion of the middle ear without signs and symptoms of infection (aural fullness, hearing loss)*

— weeks(s) —

- $\geq 3$  AOM episodes in the preceding 6-months or  $\geq 4$  AOM episodes in the preceding 12-months is recurrent acute otitis media (**RAOM**)
- OME that persists for  $\geq 3$  months from the date of onset/diagnosis is chronic otitis media with effusion (**COME**)



# Current Management of Otitis Media

---

15+ Million

Annual visits to healthcare professions  
in the U.S.<sup>1</sup>

\$5+ Billion

Annual expenditure on the management  
of otitis media in the U.S.<sup>2</sup>

Antibiotic frequently prescribed  
(over-prescribed)

AAO-HNS, AAP, and AAFP guidelines  
recommend against antibiotics in OME<sup>3</sup>

Insertion of ventilation tubes  
into the eardrum has become  
the standard of care

1 million surgeries performed annually  
in the U.S.<sup>4</sup>



1. Tong et al. BMC Health Services Research (2018) 18:318

2. Casey et al, Clin Pediatr (Phila) 2014;53:865-873

3. Rosenfeld et al, Otolaryngol Head Neck Surg 2016;154(1S):S1-S41

4. Kesser et al, Surgery of Ventilation and Mucosal Disease 2010;(6):73-91

# Physician Management of Otitis Media

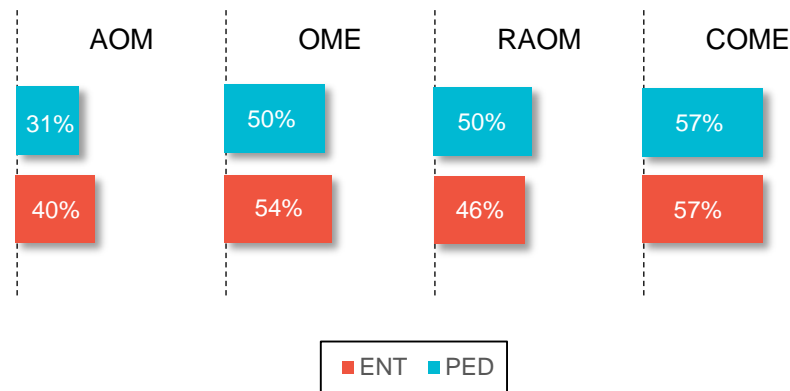
Novus conducted quantitative market research with 50 Pediatricians (“PED”) and 30 Otolaryngologists (“ENT”) to better understand the current management of otitis media and the potential utilization of OP0201 for otitis media

PED/ENTs manage a large number of OM patients

PED	Average	Median	Range
Monthly OM Patients	156	90	35-600
Age of OM Patients (years)	3	3	0-25

ENT (61% pediatric)	Average	Median	Range
Monthly OM Patients	93	40	15-600
Age of OM Patients (years)	17	10	0-98

PED/ENTs intend to utilize OP0201 across all OM types  
*(represents more than 6 million prescriptions annually)*







Surfactant Program

# Overview of Surfactant Program

---

- OP0201 is a novel nasal aerosol, drug-device product being developed as a first-in-class treatment option for otitis media
- Proprietary formulation of two active ingredients
  - *Dipalmitoylphosphatidylcholine (DPPC)*
  - *Cholesteryl palmitate (CP)*
- Daily nasal spray designed to help restore and maintain Eustachian tube (ET) function
  - *Lowers ET surface tension and promotes “de-sticking”*
- Supportive data animal and human data
  - *Proof of concept successfully demonstrated in multiple animal species, plus supportive anecdotal evidence in humans*
  - *Safety and tolerability demonstrated in three phase 1 clinical studies (studies C-001, C-002, C-004)*

# OP0201 Preclinical Animal Studies

Study	Description	Animals	Result
1	Administration of OP0201 in a metered dose aerosolized intranasal delivery system to healthy animals <sup>1</sup>	Gerbils + Mice	Reduction of Eustachian tube passive opening pressure within minutes of administration
2	Administration of OP0201 in a metered dose aerosolized intranasal delivery system to animals with OME <sup>2</sup>	Gerbils	Reduction in both the severity and duration of OME
3	Administration of OP0201 in a metered dose aerosolized intranasal delivery system to animals with AOM <sup>3</sup>	Chinchillas	Reduction in both the severity and duration of AOM

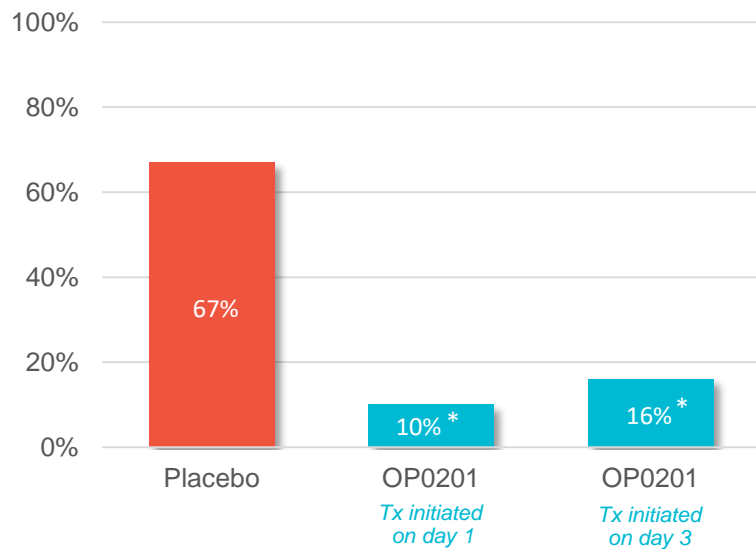
1. Chandrasekhar et al, Otology and Neurotology 2002;23:3-7

2. Venkatayan et al, Otolaryngology Head Neck Surgery 2001;124:388-93

3. Chandrasekhar and Mautone, Laryngoscope 2004;114:472-85

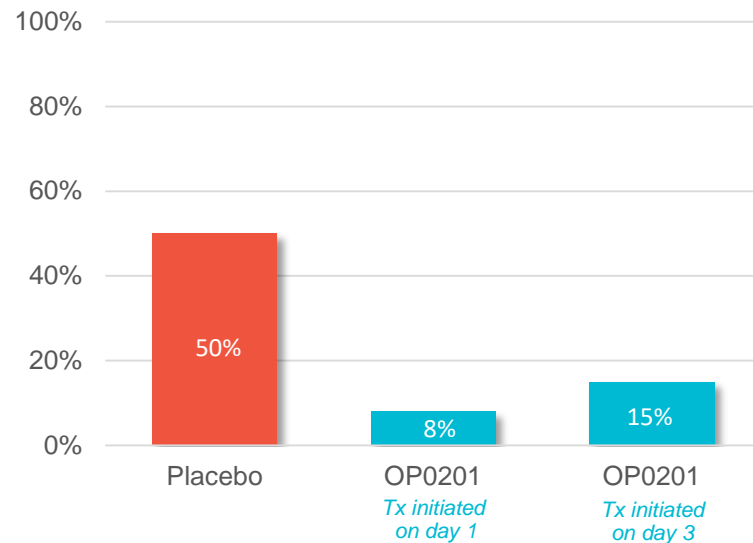
# Chinchillas with AOM (Study #3)

## Middle Ears with Infection (Day 27)



\* P = 0.002

## Inner Ears with Inflammation (Day 8)





# OP0201 Prior Human Experience



Prior to acquiring rights to the surfactant program, the inventors treated 9 human patients with various OM/ETD conditions

- *Ages ranged from 4 – 75 years old*
- *Used for both treatment and prevention*
- *Some subjects used the product over years*
- *Captured as case studies and reported to FDA (also used in a patent application)*
- *Experience was consistent with animal data*

# OP0201 Phase 1 Single-Dose Study (Pressure Chamber)

## Study C-001

- ✓ Randomized, double-blind, cross over, trial in healthy adults under hyperbaric/hypobaric atmospheric conditions (N=17)
- ✓ Designed to evaluate safety and tolerability, and explore Eustachian tube function, of OP0201 within a 150-minute observation period
- ✓ Study demonstrated that a single 20 mg dose of intranasal OP0201 is safe and tolerable

## Summary of Treatment-Emergent Adverse Events (Safety Population)

	Cohort A (n=8)		Cohort B (n=9)		Overall (N=17)
	Placebo Period	OP0201 Period	OP0201 Period	Placebo Period	
Any TEAE	7 (87.5%)	6 (75.0%)	6 (66.7%)	7 (77.8%)	15 (88.2%)
Treatment-related TEAEs	3 (37.5%)	1 (12.5%)	2 (22.2%)	1 (11.1%)	6 (35.3%)
Any TEAEs leading to drug withdrawal	0	0	0	0	0
Any TSEAEs	0	0	0	0	0
Any treatment-related TSEAEs	0	0	0	0	0
Any deaths	0	0	0	0	0

# OP0201 Phase 1 Single-Dose Study (AOM Patients)

## Study C-004

- ✓ Randomized, double-blind, placebo-controlled, parallel-group trial in adults with acute otitis media and ear pain (N=24)
- ✓ Designed to evaluate OP0201 safety and tolerability, and explore ear pain relief within a 60-minute post-dose observation period
- ✓ Study demonstrated that a single 20 mg dose of OP0201 is safe and tolerable

## Summary of Treatment-Emergent Adverse Events (Safety Population)

	Placebo (N=12)	OP0201 (N=12)	Overall (N=24)
Any TEAE	6 (50.0%)	2 (16.7%)	8 (33.3%)
Treatment-related TEAEs	6 (50.0%)	2 (16.7%)	8 (33.3%)
Any TEAE leading to discontinuation from study or study treatment	0	0	0
Any TESAE	0	0	0
Any treatment-related TESAEs	0	0	0
Any deaths	0	0	0

# OP0201 Phase 1 Multi-Dose Study (Healthy Subjects)

## Study C-002

- ✓ Randomized, double-blind, placebo-controlled, parallel-group, dose-escalation study in healthy adults (N=30)
- ✓ Designed to evaluate OP0201 safety and tolerability with three time per day administration over 14 consecutive days
- ✓ Study demonstrated that repeated dosing of OP0201 at 30 mg/day and 60 mg/day is safe and tolerable

## Overview of Incidence of Treatment-Emergent Adverse Events (Safety Analysis Set)

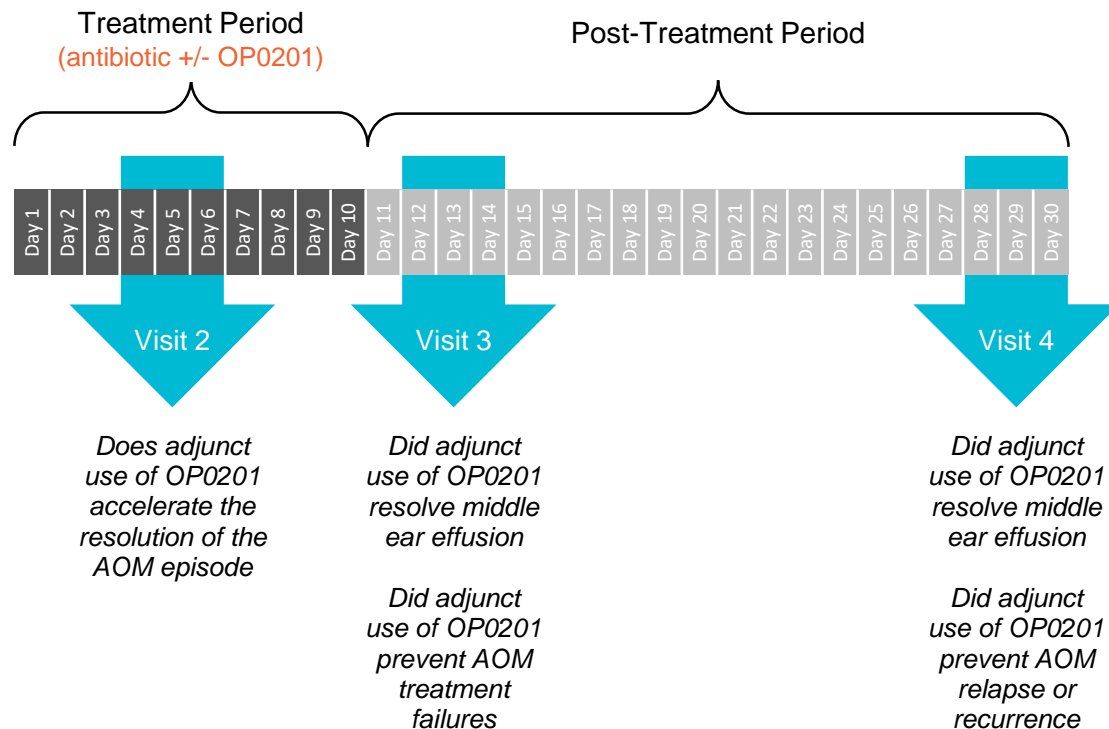
	30 mg OP0201 (N=12)	60 mg OP0201 (N=12)	All OP0201 (N=24)	All Placebo (N=6)	All Treated (N=30)
Any TEAE	5 (41.7%)	9 (75.0%)	14 (58.3%)	4 (66.7%)	18 (60.0%)
Related TEAEs	4 (33.3%)	8 (66.7%)	12 (50.0%)	4 (66.7%)	16 (53.3%)
Serious TEAEs	0	0	0	0	0
Related Serious TEAEs	0	0	0	0	0
Severe TEAEs	0	0	0	0	0
TEAEs resulting in study drug discontinuation	0	0	0	0	0
TEAEs resulting in death	0	0	0	0	0



# OP0201 Phase 2a Study (AOM Patients)

## Study C-006

- ✓ Randomized, double-blind, placebo-controlled, parallel-group trial in infants and children with acute otitis media (N~140)
- ✓ Designed to evaluate safety and tolerability, and explore efficacy of OP0201 when administered as an adjunct to oral antibiotics
- ✓ Enrollment ongoing with results expected 1H 2020



# OP0201 Future Phase 2 Clinical Studies

---

- Study C-007: Assessment of safety, tolerability and efficacy of OP0201 Nasal Aerosol as an adjunct treatment for acute otitis media in infants and children
  - *Final study design pending result from ongoing study C-006*
- Study C-009: Assessment of safety, tolerability and efficacy of OP0201 Nasal Aerosol as a treatment for chronic otitis media with effusion in infants and children
  - *September 2019 meeting with FDA to discuss proposed study protocol*



Otitis Externa

# Overview of Acute Otitis Externa



## Inflammation and infection

Common condition of the external ear canal involving inflammation and infection



## Symptoms

Symptoms include ear pain, itching, edema, reddening of the skin, and ear discharge



## Chronic dermatologic conditions

Causes include trapped moisture, trauma, poor cleanliness, and chronic dermatologic conditions



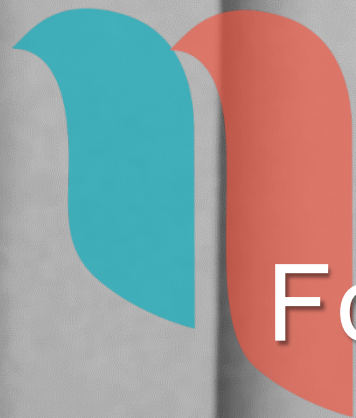
## Antibiotic prescriptions

6.7 million antibiotic prescriptions written for the ear annually in the U.S.<sup>1</sup>



1. IQVIA (IMS Health) NSP and NPA data 2015





Foam Program



# Overview of Antibiotic Ear Foam



Novus developed a novel aerosol foam to be used as a drug delivery vehicle (ears, nose/sinus)

Completed successful phase 2 clinical trial in AOE with a first-generation, antibiotic-only product (OP0101)

- *Non-inferior to CIPRODEX® using 50% fewer doses*

Completed initial formulation work on OP0102, a second-generation combination drug product intended to be a clinically differentiated treatment option for AOE

- *Addition of anesthetic for rapid pain relief (unmet need)*
- *Shorter treatment duration (less than 7-days)*

# Intellectual Property

---



## Surfactant Patents and Applications

7 U.S. and 3 foreign patents (last to expire issued patent in the U.S. in Nov 2019)

1 U.S. patent application, 1 International (PCT) patent application, and 2 foreign patent application (methods of use with expiration 2036+)

1 provisional patent application claiming novel drug substance and pharmaceutical compositions (composition of matter with expiration 2039+)



## Foam Patents and Applications

3 U.S. and 7 foreign patents (last to expire issued patent in the U.S. in Sep 2027)

2 U.S. patent applications, 1 of which has recently been allowed, and 3 foreign patent applications (allowed U.S. application will expire in Dec 2033, absent any adjustments)



# Novus Therapeutics, Inc.

Nasdaq: NVUS

19900 MacArthur Blvd., Suite 550  
Irvine, California 92612  
Phone: (949) 238-8090  
[novustherapeutics.com](http://novustherapeutics.com)

