



INITIATION REPORT

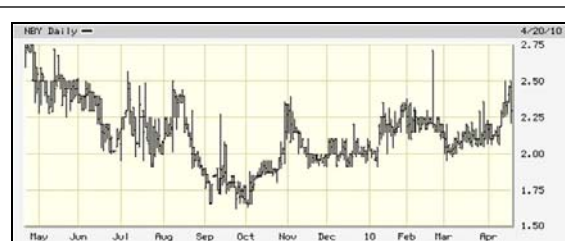
Pharmaceutical Industry • April 21, 2010

NOVABAY PHARMACEUTICALS (AMEX: NBY)

- Based on the immune system's own chemistry, new anti-infective agents, dubbed Aganocides, have a broad spectrum of activity against bacteria, viruses, and fungi.
- Galderma and Alcon partnering deals validate NovaBay's technology.
- Clinical trials are under way to establish the efficacy of Aganocides:
 - Galderma is conducting clinical trials involving patients with impetigo and acne.
 - Alcon aims to create the first therapy for both viral and bacterial conjunctivitis.
 - NovaBay's internal R&D program is targeting catheter-associated urinary tract infections and fungal infections of the nails.
- We are initiating coverage with a **BUY** recommendation and a target price of \$9.00 per share.

NovaBay Pharmaceuticals, Inc. (AMEX: NBY) is a clinical-stage pharmaceutical company that has a patented platform of antimicrobial agents, based on the chemistry of the innate immune system. Specifically, the company has formed stable halogenated compounds that chemically modify the outer membranes of bacteria, viruses, and fungi and subsequently attack the microbes' internal membranes and proteins. The primary focus is currently on NVC-422, or *N,N*-dichloro-2,2-dimethyltaurine. The compound has been partnered with Galderma for all major dermatological indications other than onychomycosis (nail fungus), and it is currently undergoing clinical trials involving acne and impetigo. NovaBay has also formed a partnership with Alcon for use of its compounds against infections of the eye, ear, and sinus, and for the development of a contact lens solution. An internal R&D program is examining NVC-422 for the prevention/treatment of (i) urinary tract infections associated with Foley catheters and (ii) onychomycosis (nail fungus).

Share Price (4/20/10)	\$2.50
52-Week Price Low / High	\$1.62-\$2.75
Mkt. Capitalization (issued)	\$58.3 M
Shares Outstanding (issued)	23.31
12-month Target Price	\$9.00
Website	www.novabaypharma.com



Source: BigCharts.com

We believe NovaBay Pharmaceuticals stock is a compelling investment opportunity, because each of the the aforementioned projects has the potential to drive the company's valuation markedly higher. Accordingly, we are initiating coverage of NovaBay with a BUY recommendation and a price target of \$9.00 per share.

KEITH A. MARKEY, PH.D. 212-514-7914 KMARKEY@GRIFFINSECURITIES.COM	CHRISTYNA BEDRIJ 212-509-9500 CBEDRIJ@GRIFFINSECURITIES.COM	MARK MERRILL 646-442-1441 MMERRILL@GRIFFINSECURITIES.COM
--	--	--

INVESTMENT HIGHLIGHTS/KEY POINTS:

PUTTING NATURE'S OWN CHEMISTRY TO WORK. NovaBay was founded on a discovery that a chemical used by the immune system against infectious agents could serve as the foundation for antimicrobial agents. The chemical, *N,N*-dichlorotaurine, was well known at that time, but it could never be used because it is unstable. Dr. Ron Najafi, the CEO of NovaBay, succeeded in making modifications to create a stable compound that still mimics the activity of the natural chlorinating agent. Like the naturally occurring molecule, the Company's *N,N*-dichloro-2,2-dimethyltaurine chemically attacks a wide spectrum of microbes including bacteria, fungi, and viruses, indiscriminately. Chlorination begins at the exterior wall, facilitating penetration to the interior where additional oxidative reactions alter the structures of internal membranes and proteins. This takes place with such rapidity and so pervasively that the microbes do not have an opportunity to evade destruction directly or through mutation. Yet, the compound has shown little propensity to have toxic side effects in humans.

STRONG DATA AND PATENTS UNDERPIN PARTNERING AGREEMENTS WITH INDUSTRY LEADERS. NovaBay has protected its technology base through extensive international patents on its individual compounds and related halogenated molecules. The intellectual property extends to the use of these molecules and to their manufacture. These patents, plus data demonstrating the broad spectrum of antimicrobial activity of *N,N*-dichloro-2,2-dimethyltaurine, have formed the basis of ongoing collaborations with Galderma, the largest pharmaceutical company specializing in dermatological agents in the United States, and Alcon (NYSE: ALC), the largest eye-care company in the world.

- **GALDERMA IS DEVELOPING TREATMENTS FOR ACNE AND IMPETIGO.** The dermatology specialist has agreed to pay up to \$50 million in developmental milestones and escalating double-digit royalties on sales of its products that are based on NovaBay's leading anti-microbial agent. The partnership, which was formed in March 2009, grants Galderma access to Aganocide technology for all dermatological applications, except onychomycosis. In return, the Company gained Galderma's marketing support in all geographic markets except Asia. In the United States, NovaBay has the right to co-market its products to hospitals and other healthcare institutions, and in Japan, the two partners share marketing rights. Galderma also agreed to fund the clinical development program for all geographic markets except in Japan.
- **ALCON IS TESTING A NEW THERAPY FOR VIRAL CONJUNCTIVITIS.** The lead program under a partnership established in 2006 could have large ramifications in the conjunctivitis market. NovaBay's compounds have shown good activity against bacteria, viruses, and fungi, which means that an Aganocide-based therapy for conjunctivitis may prove effective for any patient with this eye infection. That is important because today's drugs only target bacterial infections, and viruses account for 20%-70% of all conjunctivitis cases. But then, because antibiotic resistance is rising, even patients who are treated appropriately may receive no benefit. Alcon recognized this huge market potential and entered into the partnership by agreeing to pay NovaBay \$10 million on signing, up to \$70 million in milestones, up to \$20 million in R&D funding, and royalties in the high single-digit range. Moreover, Alcon agreed to finance the entire clinical development program. The partnership extends to the use of Aganocides for other eye, ear, and sinus infections, as well as contact lens solutions. NovaBay has the right to co-market ear and sinus medications in Asia with Alcon.
- **RESEARCH SUPPORTS THE USE OF AGANOCIDES FOR IMPORTANT PROPHYLACTIC/THERAPEUTIC PURPOSES.** The Company has an internal development program that is investigating the use of its compounds to prevent and/or treat two types of infections. A Phase II clinical trial is scheduled to commence later this year to establish the proof of concept in preventing catheter-associated urinary tract infections (CAUTIs) in patients with indwelling Foley catheters. This is an important indication, partly because of the number of individuals who are at risk and partly because of the medical expenses associated with treating these infections. We estimate this segment of the CAUTI market for Aganocides is \$250 million. The second internal development program will likely move a formulation of NVC-422 into the clinic as a therapy for onychomycosis (nail fungus).

Again, the market for this product is very large, numbering an estimated 31 million individuals in the United States alone. Given the characteristics of today's therapies, we believe a new treatment that offers a better efficacy and safety profile would gain wide acceptance in this huge market.

A sound company in good hands. Management has shown its experience and business acumen in multiple ways – it has developed novel, proprietary compounds for numerous applications; focused the R&D program on indications with attractive potential returns; negotiated for non-dilutive deals to secure marketing support from leaders in their fields of medical specialization, and maintained the Company on a sound financial footing. In addition, management expanded the Company's patent portfolio last year via a licensing agreement with Austrian scientists who have worked extensively with the natural antimicrobial agent *N*-chlorotaurine. With important milestones approaching, we believe NovaBay will gain even greater momentum to carry its programs through to commercialization. And as the programs advance, more partnering agreements will probably follow.

NOVABAY SHARES – AN UNDISCOVERED INVESTMENT OPPORTUNITY. We believe investors have overlooked the important assets residing in NovaBay. This is unlikely to continue much longer, however, as the Company will report on numerous milestones this year. Proof-of-concept data will be presented from the conjunctivitis, impetigo, and catheter-associated UTI clinical trials. Alcon's recent decision to increase its funding of NovaBay research augurs well, in our view, of the results that will be forthcoming. In addition, management has several strategic alternatives to consider, notably partnering agreements to gain or enhance marketing support for its products in Japan and other Asian territories. These may come with non-dilutive financial support, but then, existing collaborations will probably yield sizable milestones as Phase III clinical trials begin. Other opportunities may present themselves as well, since the in-house programs have yet to be partnered, including onychomycosis. Behind all of these endeavors is the solid patent estate that the Company has built around its novel chemistry. Taking into account the factors associated with any drug development program, potential commercialization timeframes, and market opportunities, our models have yielded a value of \$9.00 per share. Accordingly, we are initiating coverage of NovaBay Pharmaceuticals (AMEX: NBY) with a BUY rating and a target price of \$9.00.

TABLE OF CONTENTS

Historical Progress	5
Near-Term Milestones	5
Management	6
Board of Directors	6
Scientific Advisory Board	7
Ophthalmic Advisory Committee	8
Aganocide Technology	9
The Galderma Partnership	11
Impetigo	12
Acne.....	12
The Alcon Partnership	13
Conjunctivitis	14
Ear Infections.....	14
Sinusitis	15
Internal R&D Programs	15
Catheter-Associated Urinary Tract Infections	15
Onychomycosis	17
Intellectual Property	19
Investment Concerns and Risks	20
Financial Forecasts & Valuation	21
Sources of Revenue	21
Income Statement	25
Balance Sheet	26
Capital Expenditure Projections	26
Discounted Price Model.....	26
Discounted Cash Flow Analysis	27
Disclosures	28

HISTORICAL PROGRESS

- 2000 Ron Najafi founded NovaCal Pharmaceuticals to develop novel anti-infective compounds derived from compounds used by the innate immune system.
- 2006 Alcon agreed to license the Aganocide NVC-422 for eye, ear, and sinus infections.
- 2007 The corporate name is changed to NovaBay Pharmaceuticals.
- 2008 NVC-422 is found to be well tolerated in the bladder in a Phase I clinical trial, paving the way for its development as a lavage solution for catheterized patients.
- 2008 NovaBay research shows that an NVC-422 nasal spray decolonized *Staphylococcus aureus*, including MRSA, from the lower nasal passages in a Phase II trial, thereby setting the stage for its development as a prophylactic agent for at-risk individuals.
- 2008 Composition of matter patent on NVC-422 issues, thereby providing protection to 2026.
- Q1'09 Galderma, S.A. licenses Aganocide compounds for all major dermatological conditions, excluding onychomycosis (nail fungus).
- Q2'09 NovaBay in-licenses patents on *N*-chlorotaurine and established a working relationship with the original patent holders, Professors Nagl and Gottardi of Austria.
- Q3'09 Alcon initiates Phase II clinical trial of NVC-422 for viral conjunctivitis.
- Q3'09 Galderma initiates Phase II clinical trial of NVC-422 for impetigo.
- Q3'09 Aganocides are found effective in killing bacteria that have developed multidrug resistance.
- Q3'09 NovaBay demonstrates Aganocides are effective in preclinical model of onychomycosis.
- Q4'09 Alcon agrees to major increase in funding and support of NovaBay programs.
- Q1'10 NovaBay receives \$3.75 million in milestone payments from Galderma.
- Q1'10 NovaBay announces 2009 financial results with annual net cash-burn of only \$800,000.

NEAR-TERM MILESTONES

- Q2'10 Commence Phase IIa acne clinical trial with Galderma.
- Q3'10 Report results from proof-of-concept impetigo clinical trial conducted with Galderma.
- Q4'10 File IND to initiate otitis externa clinical trial with Alcon.
- Q4'10 Report top-line results from viral conjunctivitis Phase II clinical trial sponsored by Alcon.
- Q4'10 Commence Phase IIb impetigo clinical trial with Galderma.
- Q4'10 File IND to initiate sinusitis clinical trial sponsored by Alcon.
- Q4'10 Report results from Phase IIa catheter-associated urinary tract infection clinical trial.
- H1'10 Initiate Phase IIa catheter-associated urinary tract infection trial.
- H1'11 Initiate Phase III viral conjunctivitis trial with Alcon.
- H2'10 Initiate Phase IIb catheter-associated urinary tract infection clinical trial.
- H1'11 Commence Phase III catheter-associated urinary tract infection clinical trial.
- H2'11 Initiate Phase III impetigo clinical trial with Galderma.

MANAGEMENT

Ron Najafi, Ph.D. – Chairman & CEO

- Founder of NovaBay who has held top executive positions since 2002.
- Served as President and CEO of California Pacific Labs.
- Has held scientific positions with Rhone Poulenc Rorer (now sanofi-aventis), Applied Biosystems, and Aldrich Chemical.

Thomas Paulson, M.B.A. – Chief Financial Officer

- Has served in his current capacity since January 2008.
- Was a partner at Tatum LLC, executive services and consulting firm; held the positions of President and CEO of The Paulson Group, a management consulting company; and served senior management positions at Avigen, Neurogen, Ciba-Corning Diagnostics, Quidel, and Abbott Laboratories.

Behzad Khosrovi, Ph.D. – Chief Alliance Officer & Sr. VP, Product Development

- Joined NovaBay in 2003 and has directed R&D activities and managed collaborations with Alcon and Galderma.
- Has more than 30 years of industry experience, including executive positions with Neurobiological Technologies and Cetus Corporation.

Mark Anderson, Ph.D. – Chief Scientific Officer

- Joined the Company in October 2009 with many years of experience in the biotechnology industry.
- Held executive and managerial positions with Biotech Pharma Solutions, Myriad Genetics/Pharmaceuticals, Elitra Pharmaceuticals, and Pfizer-Agouran.

Roy J. Wu, M.B.A. – Sr. VP, Business Development

- Joined NovaBay in July 2009 with more than 30 years of experience in the pharmaceutical industry
- Has held business development positions with Genelabs Technologies, Kissei Pharma USA, and Quintiles-BRI, and held various positions in R&D with Syntex Corporation.

Ken Krantz, M.D., Ph.D. – VP, Medical Affairs

- Has served in his current capacity since 2003.
- Has over 30 years of experience in senior management positions with Searle, Schering-Plough, Ayerst, and Johnson & Johnson, Imclone, Neurocrine, and NaPro.

BOARD OF DIRECTORS

Ron Najafi, Ph.D. – Chairman & CEO

Charles J Cashion – Director

- Co-founder of Conatus Pharmaceuticals, where he has served as Sr. Vice President and CFO; and has held various executive positions with Idun, Quidel Corporations, and The Immune Response Corporation.

Anthony Dailley, D.D.S. – Director

- Involved in several start-up companies, including the 1-800-DENTIST referral service.

Paul E. Freiman – Director

- Chairman of Penwest Pharmaceutical Company; is a member of the board of directors of Calypte Biomedical, NeoPharm, Otsuka America Pharmaceuticals, and SciGen; and is the former Chairman and CEO of Syntex Corporation.

Harry F. Hixson, Jr., Ph.D. – Director

- Chairman & CEO of Sequenom and Chairman of BrainCells, and a member of the board of directors of Infinity Pharmaceuticals and Arena Pharmaceuticals; and has held executive positions with Amgen (President and COO) and Abbott Laboratories.

T. Alex McPherson, M.D., Ph.D. – Director

- Former CEO of Biomira and President of the Alberta and Canadian Medical Associations.

Robert R. Tufts, J.D. – Director

- Founding law partner of Tufts Stephenson & Kasper, LLP and former partner with Jackson Tufts Cole & Black, LLP.

Tony Wicks – Director

- Former CEO of American Resource Corporation and several public and private companies in Europe and the United States.

SCIENTIFIC ADVISORY BOARD**Bernard Churchill, M.D., FRCS(C), FAAP**

- The Judith and Robert Winston Chair in Pediatric Urology and is the founding director of Clark Morrison Children's Urological Center at the University of California, Los Angeles; is the former Vice Chair of the Department of Urology at UCLA's David Geffen School of Medicine and Director of the Urology Residency Program.

J. William Costerton, Ph.D.

- A world leader in biofilm research and expert in microbiology and electron microscopy, with more than 70 scientific publications and numerous awards for his work in microbiology.

M. Frederick Hawthorne, Ph.D.

- Internationally recognized scientist in nano and molecular medicine, a pioneer in boron chemistry, and winner of the Priestly Medal.

John A. Soderquist, Ph.D.

- Professor of Organic Chemistry at the University of Puerto Rico and is an internationally recognized expert in synthetic organic chemistry, including methodologies utilizing boron, silicon, and other organometallic reagents.

Larry K. Truesdale, Ph.D.

- Senior Director, External Research & Development Innovation at Pfizer, and held managerial roles in RPR, Alanex, Agouron-Pfizer, and Warner Lambert.

Roger Whiting, Ph.D.

- Co-founder, president and chief science officer of Roxro Pharma, and a 30-year veteran of the pharmaceutical industry.

OPHTHALMIC ADVISORY COMMITTEE

Stephen Wilmarth, M.D. – Chairman

- Board certified ophthalmologist with over 30 years of experience and a practicing eye surgeon.

Kathryn K. Najafi-Tagol, M.D.

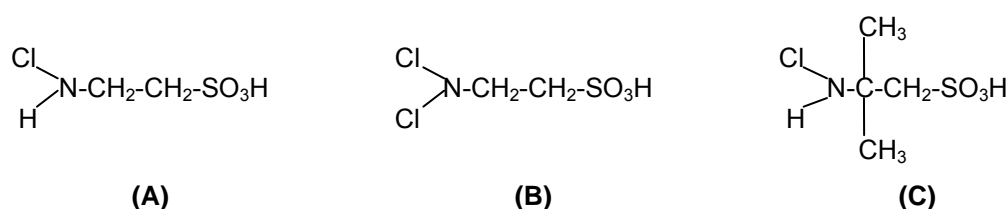
- Founding member of NovaBay Pharmaceutical's scientific advisory board and initial researcher involved in developing Aganocide compounds for ophthalmic use; and is the founder and medical director of the Eye Institute of Marin where she specializes in treating glaucoma.

Behzad Khosrovi, Ph.D., Chief Alliance Officer and Sr VP, Product Development

AGANOCIDE TECHNOLOGY

Based on the pioneering work of Chairman & CEO Ron Najafi and his team, NovaBay has developed a platform of chemical derivatives of a key compound used by the innate immune system to protect the body from infections. During oxidative burst, leucocytes generate hypochlorous acid to destroy invading microbial pathogens, and excess hypochlorous acid reacts with taurine, a non-essential amino acid that is found in abundance in the innate immune cells. The resultant product, *N*-chlorotaurine (see Figure 1A), is further chlorinated under slightly acidic conditions to *N,N*-dichlorotaurine (Figure 1B). These compounds have limited stability in solution at room temperature (half-life measured in days). NovaBay successfully modified the natural antimicrobial agents to create druggable compounds with long shelf lives. Its lead Aganocide, *N,N*-dichloro-2,2-dimethyltaurine (Figure 1C), is a broad-spectrum antimicrobial agent with a half-life measured in years.¹

Figure 1: Taurine derivatives with antimicrobial activity



Both of the natural compounds are active against bacteria, viruses, fungi, and parasites.² Moreover, *N*-chlorotaurine has anti-inflammatory effects. The antimicrobial activity is related to the compounds' ability to alter the chemical structure of the outer membrane, thereby changing its morphological appearance and increasing permeability. Once inside the microbe, chlorotaurines modify intracellular membranes and internal proteins, including heat shock proteins that aid in cell repair. These reactions quickly lead to the death of the microbe.

NovaBay's lead compound, dubbed NVC-422, has a broad spectrum of antimicrobial activity. As shown in Table 1, very low concentrations (minimum bactericidal concentrations, or MBCs) are required to kill gram positive and negative bacteria and yeast. Further experiments have extended the list of sensitive microbes to include fungi associated with onychomycosis, tinea pedis, and tinea capitis.

Pathogen	ATCC No.	MBC (µg/mL)
<i>Acinetobacter baumannii</i>	19606	4
<i>Acinetobacter calcoaceticus</i>	51432	2
<i>Enterobacter aerogenes</i>	51697	0.5
<i>Enterococcus faecalis</i>	29212	0.5
<i>Enterococcus faecium</i> [VRE]	51559	0.5
<i>Escherichia coli</i>	25922	2
<i>Haemophilus influenzae</i>	49144	0.5
<i>Klebsiella pneumoniae</i>	10031	0.25
<i>Proteus mirabilis</i>	29245	1
<i>Pseudomonas aeruginosa</i>	27853	1
<i>Serratia marcescens</i>	13880	1
<i>Serratia marcescens</i>	14756	2
<i>Staphylococcus aureus</i>	29213	2
<i>Staphylococcus aureus</i>	6538	2
<i>S. aureus</i> [MRSA]	33591	4
<i>Staphylococcus epidermidis</i>	12228	0.25
<i>Staphylococcus hominis</i>	27844	4
<i>Staphylococcus sciuri</i>	49575	0.12
<i>Candida albicans</i>	10231	32
<i>Candida glabrata</i>	90030	16

Table 1. Antimicrobial activity of NVC-422.

NovaBay's Aganocide displays a broad spectrum of activity against gram negative and gram positive bacteria and yeast. The minimum concentration of NVC-422 in pH 4 saline solution at pH 4 that was required to reduce a fixed inoculum concentration was in the 0.25 – 32 µg/mL at room temperature. This contrasts with a therapeutic concentration of 3,000 µg/mL being tested in a clinical trial.

Source: NovaBay Pharmaceuticals

¹ Wang, L, et al. *N*-chloro-2,2-dimethyltaurines: a new class of remarkably stable *N*-chlorotaurines. *Tetrahedron Lett* (2008); 49: 2193.

² Gottardi, W and Nagl, M. *N*-chlorotaurine, a natural antiseptic with outstanding tolerability. *J Antimicrob Chemother* (2010); 65(3): 399.

NVC-422 has further demonstrated activity against more than 50 strains of bacteria that have developed resistance to various antibiotics, including oxacillin, mupirocin, linezolid, vancomycin, daptomycin, imipenem, cefepime, ciprofloxacin, gentamicin, and piperacillin/tazobactam.³ Even bacteria that express specific drug efflux pumps involved in antibiotic resistance are sensitive to NovaBay's Aganocide.

Resistance to NVC-422 is unlikely to develop.⁴ NovaBay has exposed bacteria to sublethal doses of this Aganocide in an attempt to promote the development of resistant strains. Two types of bacteria were used, *E. coli* and *Staphylococcus aureus*. Both are noted for being able to develop resistance to other drugs and have been implicated in common bacterial infections. Colonies of these bacteria were exposed to 1 mM NVC-422 at pH 7 and 20 colonies that survived were sub-cultured and treated again. After 15 such passages, surviving colonies were tested for their sensitivity to the Aganocide. No change in sensitivity (as measured by the minimum bactericidal concentration) was observed for either bacterium. Given the speed at which the compound works and the extensive chemical alterations that it causes to the external membrane and intracellular components, the results should not be surprising.

NVC-422 kills bacteria without causing lysis. This is important because some microbes contain toxins and other proinflammatory molecules that can cause a severe inflammatory response. When antibiotics kill these bacteria via lysis, the reaction to the released proinflammatory molecules can threaten the patient's life. NovaBay tested its lead Aganocide's mechanism of action on different bacteria. As shown in Figure 2, the compound increases the permeability of the bacterial cell wall.

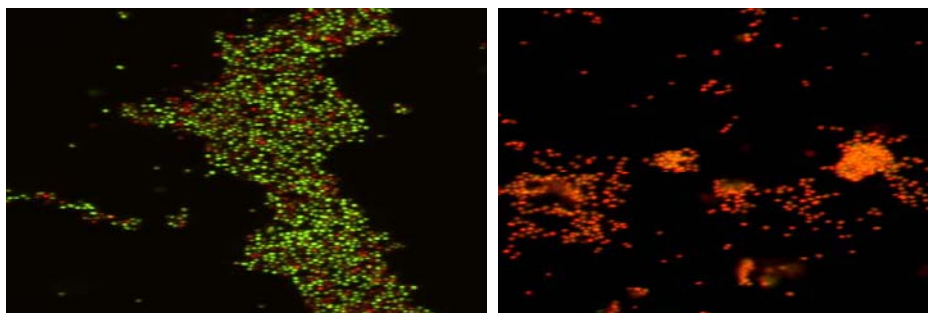


Figure 2. Detection of *S. aureus* killing by NVC-422. Left panel: Methicillin resistant *Staphylococcus aureus* (MRSA strain 33591) cells were stained with Syto-9 (green) that penetrates intact membranes and binds to DNA. Right panel: After 10 minutes exposure to NVC-422 (8 µg/mL), the cells were stained with Propidium Iodide (red), which does not penetrate cells unless their membranes are damaged.

Source: NovaBay Pharmaceuticals

Yet, NVC-422 does not lyse the bacteria when it kills them, as shown in Figure 3. In this experiment, the optical density of the solution in which the bacteria were killed was used to assess the number of "intact" cells in suspension. No release was observed, even though the live bacteria were eradicated.

³ Najafi, R. Technical presentation on Aganocides at the Ophthalmology Meeting, October 25, 2009.

⁴ Nagl, M and Gottardi, W. Enhancement of the bactericidal efficacy of *N*-chlorotaurine by inflammation samples and selected N-H compounds. Hyg Med (1996); 21: 597.

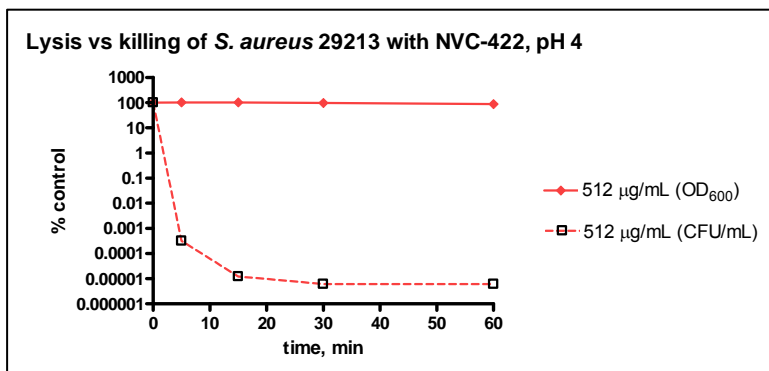


Figure 3. Lysis versus killing of *S. aureus* by NVC-422, pH 4. Bacteria were treated with NVC-422 at a concentration that reduced colony forming units (CFU/ml) by 7 log₁₀ within 30 minutes, but did not lyse the bacterial cell walls, as indicated by the lack of decline in optical density (OD₆₀₀).
Source: NovaBay Pharmaceuticals

NVC-422 is active against biofilms. This activity is important for therapeutic and prophylactic purposes, because the unique properties of biofilms render them resistant to many forms of intervention. Unlike individual bacteria or colonies composed of a single type of infectious agent, biofilms typically consist of more than one species of microbe. In addition, the bacteria have attached themselves to a surface and built a protective coating comprised largely of polysaccharides that reduces their exposure to stressors, such as drugs. As a result, biofilms are better able to develop resistance to therapies and to respond to a change in environment with the fittest microbes surviving. NVC-422’s mechanism of action is well suited to attack biofilms, since it alters the outer membrane of the microbes and eventually attacks internal structures. But even sublethal concentrations of the compound probably have a beneficial effect, as chlorination slows bacterial regrowth and reduces their virulence.⁵ Nonetheless, NVC-422 has strong microbicidal activity against biofilms.⁶

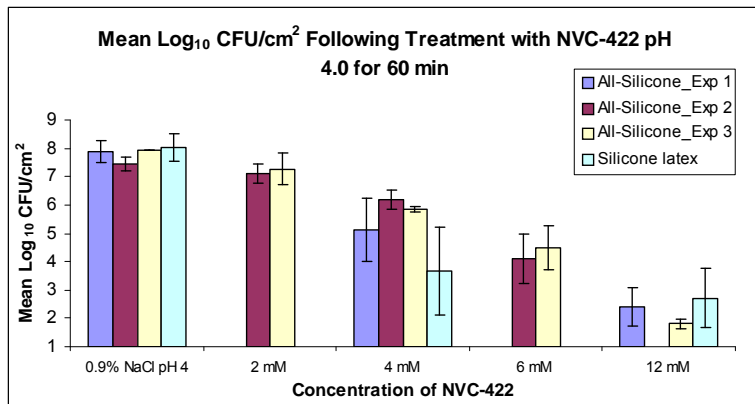


Figure 4. Average biofilm density after treatment with NVC-422.⁶ *E. coli* were allowed to establish a biofilm in a urinary catheter model and were then exposed to saline or four concentrations of NVC-422 (2mM, 4mM, 6 mM, or 12 mM) at pH 4 for 60 minutes. The number of colony-forming units (CFUs) was then assessed. Treatment with NVC-422 resulted in up to a 6 log₁₀ reduction in viable cell counts from the established biofilms.
Source: NovaBay Pharmaceuticals

THE GALDERMA PARTNERSHIP

NovaBay formed this collaboration in March 2009 to complete the development of Aganocide-based therapies for impetigo, acne, and other dermatological infections, with the exception of onychomycosis (nail fungus) and orphan drug indications. Galderma is funding all research, and NovaBay may receive up to \$50 million in milestones and escalating double-digit royalties on sales (our estimate: 10%-30%). The Company received two milestone payments totaling \$3.75 million in early January based on its completion of formulation feasibility studies for topical use and for completion of an exploratory clinical study of a treatment for adult acne. NovaBay has retained commercialization rights in all Asian markets, except Japan where it has co-promotion rights. The Company also has an option to co-promote the

⁵ Nagl, M, et al. The postantibiotic effect of N-chlorotaurine on *Staphylococcus aureus*. Application in the mouse peritonitis model. J Antimicrob Chemother (1999); 43(6): 805.

⁶ Rani, SA, et al. A novel derivative of N-chlorotaurine (NVC-422) has potent activity against planktonic and biofilm forms of common urinary pathogens. Presented at the Interscience Conference on Antimicrobial Agents and Chemotherapy, October 28, 2008.

therapies in the United States to hospitals and other healthcare institutions. The deal further specifies that NovaBay will sell the active ingredient to its partner who will complete the manufacture and packaging of the final product. We believe Galderma is a good partner, given its excellent reputation and a strong marketing presence in dermatologists' offices.

IMPETIGO

The partners initiated a Phase 2a proof-of-concept trial of NovaBay's lead Aganocide NVC-422 for the treatment of impetigo in September 2009. As discussed in the blue box below, impetigo is a common dermatological infection whose incidence is increasing. The medical community is seeking alternative treatment options to avoid problems associated with antibiotic resistance and to prevent the release of toxins that result from today's therapies. Results from the proof-of-concept trial are expected to become available in the first half of this year. A Phase III study, involving 500 – 600 patients probably will commence in early 2011. Our financial valuation models are based on an assumption that an impetigo therapy is launched in 2014.

Impetigo is a skin infection that is caused largely by two bacteria, *Staphylococcus aureus* and group A streptococci. Prevalence varies significantly by age, geography, and living conditions. Children are most affected, as one study in England found that impetigo accounts for about 56% of all skin infections in children, 16% in adults, and 6% in the elderly.⁷ Geographically, the highest reported incidence rates are found in tropical regions with relatively poor living conditions (e.g., Fiji where the average income is about \$6,000 per annum and 25.6% of children between 5 and 15 years of age are infected), while the lowest rates have been reported in temperate climates and countries with higher standards of living.^{8,9} These epidemiological findings reflect differences in sanitary conditions, exposure to environmental factors that facilitate skin infections (e.g., mosquito bites), and the proportion of body surface protected by clothing from dermatological insults. Over the past three decades, impetigo has become increasingly prevalent in more developed countries, due partly to growing reliance on day-care centers for child care. Then, too, drug resistant strains of bacteria have caused the number of impetigo-related hospital admissions to more than double in the United States between 1999 and 2005.¹⁰

Small lesions are usually treated with mupirocin ointment (sold by GlaxoSmithKline as Bactroban[®]), though systemic antibiotic therapy is required for bulbous impetigo, in which the lesion penetrates the granular skin layer due to enterotoxin associated with Staph infections. An important concern is the development of resistance to mupirocin and to such systemic antibiotics as aminoglycosides (e.g., gentamicin), beta-lactams (e.g. penicillins and cephalosporins), and macrolides (e.g., erythromycin). Impetigo that is left untreated or is treated improperly can lead to much more serious conditions, including cellulitis, abscess, bacteremia, sepsis, and post-streptococcal glomerulonephritis. Hence, a new antimicrobial agent that is capable of combating antibiotic-resistant bacteria, particularly if it does not release enterotoxin from Staph infections would likely be well received.

ACNE

The two partners plan to initiate a clinical trial of an NVC-422 preparation for acne later this year. As discussed in the blue box below, acne is an attractive indication that is addressable with NovaBay's Aganocide technology. The market is served by a broad range of products and services that include over-the-counter cleansers, topical antibiotics, ultraviolet radiation therapy, systemic antibiotics, and dermal

⁷ Elliot, AJ, et al. The association between impetigo, insect bites and air temperature: a retrospective 5-year study (1999-2003) using morbidity data collected from a sentinel general practice network database. *Fam Pract* 2006; 23(5): 490.

⁸ Elliot, AJ, et al. The association between impetigo, insect bites and air temperature: a retrospective 5-year study (1999-2003) using morbidity data collected from a sentinel general practice network database. *Fam Pract* 2006; 23(5): 490.

⁹ Fleming, DM, et al. Recent changes in the prevalence of diseases presenting for health care. *Br J Gen Pract* 2005; 55: 589.

¹⁰ Jhung, MA, et al. Enhanced detection of *Staphylococcus aureus*-related hospitalizations using administrative databases, United States-1999-2005. Presented at the 18th annual scientific meeting of the Society for Healthcare Epidemiology of America, April 6, 2008.

abrasion. An Aganocide therapeutic would probably be an appealing addition to today's alternatives, including antibiotics that are typically effective for a limited period of time based on the emergence of resistant bacteria.

Acne, which is caused by *Propionibacterium acnes*, is one of the most common skin diseases worldwide. The American Academy of Dermatology estimates that 40 million to 50 million individuals in the United States have acne, though most are teenagers or young adults. Indeed, 85% of teenagers will have acne at any given time. Most have a mild form of the disease, as the prevalence of moderate to severe acne is about 14%.¹¹ Risk factors for the moderate-to-severe acne include having a family member with a history of the disease, increasing pubertal age, seborrhea, mental stress, and certain foods (somewhat specific to each individual). Treatment for acne varies with the severity of the disease. For mild forms, topical preparations of benzoyl peroxide, antibiotics, retinoids, and salicylic acid are considered the standard of care. For more severe forms, oral antibiotics, including tetracycline, doxycycline, minocycline, erythromycin, trimethoprim-sulfamethoxazole, trimethoprim, and azithromycin, are prescribed alone or in combination with a topical medicine. Birth-control pills are also approved for acne to address a hormonal component of the disease. The most severe acne is treated with isotretinoin, a retinoid that can cause birth defects.

The drawbacks of some alternatives are apparent from a study of the cost-effectiveness of different acne therapies used by individuals with mild to moderate disease.¹² The most cost-effective option, topical benzoyl peroxide, was the most irritating to the skin, while more expensive therapies (e.g., minocycline, or a topical therapy of erythromycin and benzoyl peroxide) failed to produce an additional benefit. At the conclusion of the 18 week study, 25% had dropped out and only 50%-66% of the participants reported even a moderate improvement in their disease, while 95% still had acne and 55% sought further treatment. Hence, acne is a disease in need of improved therapeutic options.

We believe that a topical Aganocide medicine would be an ideal candidate for treating acne. NVC-422 is well tolerated, causing no obvious irritation, even when applied to the eye (see discussion below). In fact, the related natural compound *N*-chlorotaurine has anti-inflammatory properties that would address the inflammation accompanying *Propionibacterium acnes* infections. And as discussed above, bacterial resistance does not readily develop against NovaBay's lead candidate and there is no obvious cross-resistance between other drugs and this compound.

Research involving an unstable taurine derivative (*N*-bromotaurine) has provided evidence suggesting that NovaBay's compound will prove clinically useful. Treatment with that compound reduced the number of inflamed lesion counts by about 60% within four weeks and only two adverse events were reported – both were mild and limited to the skin.¹³

NovaBay and Galderma intend to initiate a clinical trial of an NVC-422 preparation for acne in the second half of this year. We believe this clinical development program will benefit from the impetigo studies and that a medicine for acne will be commercialized in 2015, a year after the impetigo drug.

THE ALCON PARTNERSHIP

NovaBay's first partnership was established in August 2006 to gain the expertise and support of a global leader in ophthalmology and related fields of medicine. The deal, inked with Alcon, grants the international specialty pharmaceutical company access to Aganocide compounds for the treatment of eye, ear, and sinus infections, as well as the development of new contact lens solutions. In exchange, the

¹¹ Ghodsi, SZ, et al. Prevalence, severity, and severity risk factors of acne in high school pupils: a community-based study. *J Invest Dermatol* (2009); 129(9): 2136.

¹² Ozolins, M, et al. Randomized controlled multiple treatment comparison to provide a cost-effectiveness rationale for the selection of antimicrobial therapy in acne. *Health Technol Assess* (2005); 9(1): iii.

¹³ Marcinkiewicz, J, et al. Topical taurine bromamine, a new candidate in the treatment of moderate inflammatory acne vulgaris – a pilot study. *Eur J Dermatol* (2008); 18(4): 433.

initial four-year agreement provided an upfront payment of \$10 million and semi-annual disbursements to support research at NovaBay, up to \$70 million in milestones and high single-digit royalties on sales of any products commercialized with an Aganocide compound. Moreover, NovaBay retained co-marketing rights for ear and sinus infections in Asia, and Alcon agreed to fund all development work. In April 2008, Novartis acquired Nestle's stake in Alcon and the new owner gained representation on the Company's board of directors. More recently, Novartis acquired a controlling stake in Alcon and has shown an interest in expediting the collaborative work by increasing the semi-annual R&D support payment by 80%, to about \$2.6 million, starting with the January/February 2010 disbursement. The agreement, which was to expire in August 2010, was also extended.

CONJUNCTIVITIS

The collaboration has progressed well, with an NVC-422 formulation currently in a Phase II clinical trial for viral conjunctivitis (also known as pink eye). (Initiation of the ongoing trial, in January 2009, triggered a \$1 million milestone payment from Alcon. As discussed in the blue box below, NovaBay's Aganocide may well emerge as the first therapy that is able to treat both viral and bacterial forms of the disease.

Conjunctivitis is an inflammation of the conjunctiva, which is the membrane that lines the eyelids and covers the surface of the eyeball. A variety of irritants can cause conjunctivitis, but approximately 70% are caused by bacterial (50%) and viral (40%) infections. Both infectious agents cause eye pain, itching, swelling, redness, and yellow or green discharge from the eye, as well as an enlargement of a lymph gland in front of the ear. As a result, symptoms cannot be used to identify the cause, and antibiotics are often used indiscriminately. Thus, more than 40% of patients are treated inappropriately, after taking into consideration infections from viruses and antibiotic-resistant bacteria. The most common bacterium associated with conjunctivitis is *Staphylococcus aureus*, which has gained notoriety for the development of resistance to the antibiotic methicillin. Infections involving *Streptococcus pneumoniae* and *Haemophilus influenzae* contribute to a lesser extent to conjunctivitis prevalence. Viral conjunctivitis, which is commonly caused by herpes simplex viruses and adenoviruses, often strikes children. Most infections are self-limiting and resolve in one to three weeks. However, if left untreated, conjunctivitis can cause more serious conditions, including punctate keratitis, bacterial superinfection, corneal ulceration, and chronic infection. Today, viral conjunctivitis caused by adenovirus is treated with best supportive care, while herpes simplex infections are treated with topical antiviral agents.

Research has shown that two viruses associated with conjunctivitis, herpes simplex 1 and 2 strains and adenoviruses can be rapidly destroyed by chlorination by the unstable natural compound, *N*-chlorotaurine.¹⁴ NovaBay and Alcon have examined NVC-422's capability to eradicate a variety of microbes under different conditions. The research has shown that the minimum bactericidal concentration increases by 8 to 16 fold (depending on the bacterium) as the pH increases from 4 to 5.9 and then, much more markedly at 7.4. However, at the concentration being tested in a Phase II clinical trial (3,000 µg/mL), the Aganocide should eliminate all bacteria and virus particles in a few seconds. A Phase I clinical trial found that concentration of NVC-422 was well tolerated by 120 healthy volunteers and that it caused no serious adverse events.

EAR INFECTIONS

The Alcon partnership includes the development of an Aganocide-based therapy for outer ear infections (otitis externa). The condition will affect four in 1,000 individuals in the United States or about 1.24 million this year.¹⁵ Acute disease is caused by bacteria (90%) or fungi (10%), while chronic disease is usually associated with a dermatological or allergic problem. With the growing number of drug-resistant bacteria, NovaBay and Alcon have the opportunity to provide a single, effective treatment for all acute otitis externa cases. Studies involving *N*-chlorotaurine suggest that NVC-422 will prove efficacious against ear infections. Strips impregnated with a 1% solution of this compound found that it was significantly more

¹⁴ Nagl, M, et al. Activity of *N*-chlorotaurine against herpes simplex-and adenoviruses. *Antivir Res* (1998); 38: 25.

¹⁵ Osguthorpe, JD, et al. Otitis externa: review and clinical update. *Am Fam Physician* (2006); 74(9): 1510.

effective than a combination of neomycin, polymyxin B, and hydrocortisone. Moreover, the time required for the disappearance of symptoms fell from 7.4 days in the control group to 5.6 days with the therapy. We have not included ear infections in our financial analysis, since clinical development has not begun.

SINUSITIS

A third indication that Alcon and NovaBay are pursuing is sinusitis. This condition is characterized by a severe inflammation of the sinus cavities in response to the presence of microbes. Scientists have yet to identify a specific causative agent(s), as the microbes isolated from the sinus passages of chronic rhinosinusitis patients have included various bacteria and fungi. Moreover, research has implicated biofilms in the condition, and that may offer the best explanation for the resistance to various therapies.¹⁶ The condition is common, affecting an estimated 34 million individuals in the United States annually.¹⁷ Research with *N*-chlorotaurine has not provided definitive evidence of a benefit, though it was considered curative in one case involving an immunosuppressed patient who had suffered repeated sinusitis caused by *P. aeruginosa*.² At this juncture, a medicine for sinusitis is not factored into our financial analysis of NovaBay, since clinical development has not commenced.

INTERNAL R&D PROGRAMS

Just as NovaBay has been very selective in partnering its technology to date, it has also been selective in focusing its internal product development efforts. As a result, it has been able to finance two projects with significant return potential into human proof-of-concept trials.

CATHETER-ASSOCIATED URINARY TRACT INFECTIONS

A Foley catheter, which is designed to ensure proper bladder drainage for up to 12 weeks in patients during acute care hospital stays and in others who rely on these devices permanently. The latter group is comprised of such individuals as those who are at least partially paralyzed or suffer from a neuromuscular disorder. Urinary catheters present a serious challenge to healthcare providers because when they are left in place for six days or longer, bacteria often populate them, resulting in urinary tract infections (UTIs). As described in the blue box below, these infections are common and are not addressed well by current prophylactic or therapeutic interventions. NovaBay's Aganocide provides a fine solution to the problem.

Catheter-associated urinary tract infections (CAUTIs) are a common affliction of patients who must rely on an indwelling catheter for prolonged periods of time. In fact, the risk of developing these infections is directly proportional to the length of time the catheter remains in place.¹⁸ Other, lesser risk factors include female gender and catheter insertion outside the operating room. A number of species of microbes have been found in Foley catheters, as shown in Table 2. They do not share the same properties as suspended colonies of bacteria, however.¹⁹ Rather in biofilms, they adhere to the catheter surface and generate an external polysaccharide matrix, which protects them from environmental stresses and the patient's immune system. In such colonies, bacteria that are normally sensitive to antibiotics demonstrate resistance. Compounding these attributes is the formation of crystals composed of calcium and magnesium phosphates that can block the catheter completely. The formation of crystals is caused by urease-producing bacteria, particularly *Proteus mirabilis*, which promotes crystal formation by raising the pH of the urine via the generation of ammonia from urea. The rate of encrustation varies directly with the pH and concentration of the urine. Changes in the composition of biofilms present another challenge. As shown in Table 2, multiple species of bacteria are commonly observed in catheter biofilms, which means that biofilms can change in response to their environments. For instance, exposure to antibiotics will select for drug-resistant species. In fact, the Centers for Disease Control and Prevention believes that CAUTIs comprise the largest institutional reservoir of nosocomial, multidrug resistant

¹⁶ Bezerra, TFP, et al. Biofilm in chronic sinusitis with nasal polyps: pilot study. *Braz J Otorhinolaryngol* (2009); 75(6): 788.

¹⁷ Bhattacharyya, N. Contemporary assessment of the disease burden of sinusitis. *Am J Rhinol Allergy* (2009); 23(4): 392.

¹⁸ Maki, DG and Tambyah, PA. Engineering out the risk of infection with urinary catheters. *Emerg Infect Dis* (2001); 7(2): 1.

¹⁹ Stickler, DJ. Bacterial biofilms in patients with indwelling urinary catheters. *Nature Clin Pract Urol* (2008); 5(11): 598.

pathogens, including *Klebsiella*, *Enterobacter*, *Proteus*, *Citrobacter*, *Pseudomonas aeruginosa*, enterococci, staphylococci, and *Candida*. Occlusion of the catheter can also occur because some bacteria, notably *Ps. aeruginosa* and *K. pneumoniae*, produce large amounts of external polysaccharide matrix and form mucoid biofilms.

Table 2. Incidence of bacterial species isolated from 106 catheter biofilms²⁰

(Species No. (% of catheters colonized by each species))

Species	All Catheter biofilms*	Mixed species biofilms†	Single-species biofilms‡
<i>Ps. aeruginosa</i>	38 (35.9)	31 (40.8)	7 (23.3)
<i>Ent. faecalis</i>	36 (34.0)	34 (44.7)	2 (6.7)
<i>E. coli</i>	33 (31.1)	31 (40.8)	2 (6.7)
<i>P. mirabilis</i>	32 (30.2)	26 (34.2)	6 (20.0)
<i>K. pneumoniae</i>	19 (17.9)	18 (23.7)	1 (3.3)
<i>M. morgani</i>	14 (13.2)	11 (14.5)	3 (10.0)
<i>Prov. stuartii</i>	11 (10.4)	9 (11.8)	2 (6.7)
<i>Staphylococcus aureus</i>	11 (10.4)	10 (13.2)	1 (3.3)
<i>Ent. cloacae</i>	9 (8.5)	7 (9.2)	2 (6.7)
<i>Klebsiella oxytoca</i>	9 (8.5)	8 (10.5)	1 (3.3)
Other <i>Providencia</i> spp.	5 (4.7)	4 (5.3)	1 (3.3)
Coagulase-negative staphylococci	5 (4.7)	4 (5.3)	1 (3.3)
<i>Citrobacter</i> spp.	4 (3.8)	4 (5.3)	0 (0.0)
<i>Proteus vulgaris</i>	3 (2.8)	2 (2.6)	1 (3.3)

*All 106 catheters.

†The 76 catheters from which \geq two organisms were isolated.

‡The 30 catheters on which single-species biofilms were found.

CAUTIs, if treated ineffectively, can result in other conditions, including bladder and kidney stone formation and kidney and systemic infections. Accordingly, different prophylactic approaches have been standardized to reduce the incidence of infection, though none are actually preventative.²¹ The techniques used to insert the catheter and maintain the collection bag have been optimized. Minimizing the number of days a catheter is in place (ideally to less than six days) has reduced the incidence of CAUTIs in the institutional setting. However, flushing the catheter with antibiotic solutions and taking systemic antibiotics are no longer advisable for patients who require catheterization for more than a short period of time, unless their specific health needs require it (e.g., bladder surgery patients or those with a weakened immune system). In addition, catheters impregnated with antimicrobial agents, notably silver, have been developed. They met with some success in clinical trials, but the benefit is limited largely to gram positive bacteria and yeast. Moreover, they have been associated with an increase in CAUTI incidence, since healthcare workers relied on the antibacterial properties of the catheter and paid less attention to proper handling procedures.

Despite the various efforts to prevent CAUTIs, these infections impose a sizable financial burden on the nation's healthcare system and on individual patient's health.²² The number of catheters sold annually is about 100 million, with one-quarter sold in the United States. Their use results in over one million CAUTIs per annum, or over 40% of all nosocomial infections in hospitals and nursing homes and roughly \$450 million in medical costs. These costs are expected to rise in the decades ahead, as the elderly population increases. Hence, a new approach to preventing CAUTIs is greatly needed.

²⁰ Macleod, SM and Stickler, DJ. Species interactions in mixed-community crystalline biofilms on urinary catheters. *J Med Microbiol* (2007); 56(Pt 11): 1549.

²¹ Gould, CV, et al. Guideline for prevention of catheter-associated urinary tract infections 2009. Published by the Healthcare Infection Control Practices Advisory Committee.

²² Jacobsen, SM, et al. Complicated catheter-associated urinary tract infections due to *Escherichia coli* and *Proteus mirabilis*. *Clin Microbiol Rev* (2008); 21(1): 26.

NovaBay has developed an Aganocide based irrigation solution that offers the first complete approach to preventing/treating CAUTIs. The solution contains NVC-422 in saline at pH 4. The antimicrobial agent has a broad spectrum activity that includes the bacteria associated with UTIs, as well as fungi. Moreover, it is prepared in a solution that is acidic, which optimizes the antimicrobial activity of NVC-422 and it counters the ability of *P. mirabilis* to raise the pH of urine and to promote crystal formation. *In vitro* experiments have also shown that mixing NVC-422 with urine at a 1:1 ratio at physiological temperatures results in 50% of the active compound still being present after one hour. And, the antimicrobial activity of the solution is actually increased with incubation with urine, possibly through the formation of secondary chloramines. Just as important, NVC-422 showed concentration-dependent activity (2 mM – 12 mM) in reducing bacteria by about 6 log₁₀ in a urinary catheter model.

Clinical data indicate the irrigation solution is well tolerated. The bladder capacity of each patient enrolled in a Phase I trial was assessed and a catheter was inserted to drain the bladder. Sufficient NVC-422 irrigation solution was then administered and held in the bladder for one hour. Patients reported no serious problems and no adverse events were observed.

Early Phase II clinical data shows signs of efficacy. NovaBay recently reported data from an open-label, Phase IIa trial involving patients requiring chronic transurethral catheterization. The patients enrolled were catheterized for at least one month prior to commencement of the study, had documented high levels of bacteriuria, and had not been treated with antimicrobial agents during the preceding week. Treatment involved instilling a sterile solution of 0.1% or 0.2% NVC-422 into the bladder and clamping the catheter for one hour before allowing it to drain. (Volumes, of 25 – 100 mL, were appropriate for each patient's bladder capacity.) The first group of five patients received a single administration of 0.1% NVC-422, and some transient antimicrobial activity was observed. The treatment was well tolerated. The next cohort received daily administration of the 0.1% sterile solution for seven days, and the third group of patients was treated with 0.2% NVC-422 daily for seven days. Despite having high urinary concentrations of bacteria (greater than 100,000 colony-forming units per mL) at baseline, a number of patients exhibited no infection by the end of the treatment, particularly among those given the higher dose. All patients tolerated the therapy well and no significant treatment-related adverse events were observed.

A multi-center Phase II trial is scheduled to commence in the third quarter. The study will be used to confirm the earlier results and to optimize the therapy for patients with urinary catheter blockage and encrustation.

ONYCHOMYCOSIS

NovaBay's agreement with Galderma does not include fungal infections of fingernails and toenails, known as onychomycosis. The Company intends to pursue this indication for its Aganocide compounds, at least until it has completed a proof-of-concept clinical trial. At that point, the agreement with Galderma may be expanded to include this indication. As discussed in the blue area below, this fungal infection presents a variety of challenges to drug developers in creating a suitable antimicrobial agent in an appropriate formulation and in demonstrating efficacy to meet FDA requirements.

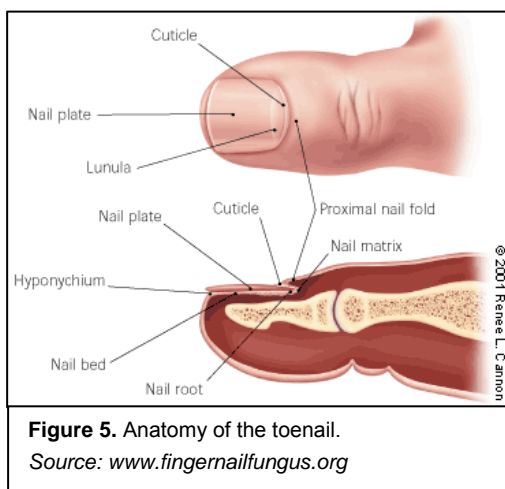
Onychomycosis is a fungal infection of the fingernails and/or toenails that afflicts 6%-10% of the population, with 65%-75% of the cases being mild to moderate in severity.^{23,24} The fungi *Trichophyton rubrum* and *Trichophyton mentagrophytes* are responsible for more than 90% of all cases. The disease varies with geography/climate, but the general risk factors are old age, diabetes, HIV infection, immunosuppressant therapy, genetic susceptibility, hyperhidrosis, trauma, and peripheral vascular disease. Generally, risk increases as nail growth slows as a part of ageing, due to certain medical

²³ Gupta et al. Prevalence and epidemiology of onychomycosis in patients visiting physicians' offices: a multicentre Canadian survey of 15,000 patients. *J Am Acad Dermatol* (2000); 43(2 Pt1): 244.

²⁴ Roberts, DT, et al. Guidelines for treatment of onychomycosis. *Br J Dermatol* (2003); 148: 402.

conditions, or as a person's immune system weakens because of age, a medical condition, or drug therapy.

Several oral and topical agents are used to treat onychomycosis, based upon the number of nails involved and the clinical presentation of the infection within the nail plate. Figures 5 and 6 show the anatomy of the toenail and provide examples of onychomycosis infections.



Involvement of the lunula (Figure 5) is key to use of systemic therapy or surgery. Less pervasive infections may be treated with topical or systemic medicines, or a combination. Lateral nail plate involvement with a separation of the nail from the nail bed reduces the vascular access to the plate and limits the efficacy of systemic treatments. On the other hand, a thickening of the nail as a result of matrix involvement can limit drug penetration by both topical and systemic medicines. It is not surprising, therefore, that today's topical drug formulations have low efficacy rates and that even systemic therapies have relapse rates of 40% or higher.

Today's oral drugs include terbinafine (sold as Lamisil® by Novartis [NYSE: NVS]); itraconazole (sold as Sporanox® by Johnson & Johnson [NYSE: JNJ]); and a generic drug, griseofulvin; and the topical medicines are ciclopirox (sold as Penlac® by Sanofi-Aventis [NYSE: SNY]) and amorolfine (sold as Loceryl™ outside the United States by Roche Holdings [SWX: RO]). Given the challenges that onychomycosis presents to pharmaceutical intervention, it is not surprising that systemic therapies have captured 80% of the \$1.5 billion market. Development of a more effective topical medicine, which is the goal of several companies in the pharmaceutical industry (e.g., Dow Pharmaceutical Sciences, Talima Therapeutics, and Topica Pharmaceuticals)²⁵, would play a major role in expanding the market.

Research with *N*-chlorotaurine has shown that the natural antimicrobial agent has activity against *Candida*, *Aspergillus*, *Fusarium*, *Penicillium*, and *Alternaria* species.²⁶ Similarly, NVC-422 has demonstrated good activity against fungal infections of the skin and nails. In a preclinical model used to test FDA-approved antifungal agents, a 2% preparation administered three times per day for seven days achieved a 36.6% clinical improvement against a topical infection, compared with a 7.2% improvement in the same test by a commercial antifungal agent, ciclopirox (Penlac®). In a separate set of *in vitro* experiments, NVC-422 and a related compound, NVC-612 (*N*-chloro-2,2-dimethyltaurine), were highly effective against *Trichophyton rubrum*, the fungus that causes most nail infections, in an experimental nail chamber. We believe these results are very encouraging, as onychomycosis constitutes a huge commercial opportunity, afflicting an estimated 31 million individuals in the United States alone. NovaBay

²⁵ Source: www.clinicaltrials.gov, accessed April 2010.

²⁶ Nagl, M, et al. Enhanced fungicidal activity of *N*-chlorotaurine in nasal secretion. *J Antimicrob Chemother* (2001); 47(6): 871.

intends to pursue a clinical development program for this indication, though the exact timing has yet to be determined.

INTELLECTUAL PROPERTY

2009 was a watershed for NovaBay's intellectual property estate. In January, the U.S. Patent and Trademark Office approved a composition of matter patent on NVC-422, extending protection through April 24, 2026. Then, in April, the Company licensed the intellectual property developed by Professors Nagl and Gottardi of the Medical University of Innsbruck, Austria. (We have identified 10 patents that these scientists have pending worldwide.²⁷) Besides garnering patents related to their work with *N*-chlorotaurine and related compounds, the deal included preclinical and clinical data from the professors' research and established a working relationship with them for future investigations.

As a key scientist behind the discoveries at NovaBay, CEO Ron Najafi had his colleagues have 19 patents filed and/or granted in the United States and various countries worldwide.²⁸ The Company's December 31, 2009 10K cites three issued, eleven pending utility, and several provisional patents in the United States as important to its operations. In addition, the Company has one issued patent in China, Hong Kong, Israel, India, Mexico, and South Korea, and pending applications filed under the Patent Cooperation Treaty in various stages of examination. These cover methods relating to the manufacture and use of a compound for wounds, compositions of matter of the Aganocide compounds, methods of treatment utilizing the Aganocide compounds, and formulations. Overall, we believe NovaBay has built a sound patent estate around its key technologies.

Complementing the patents are applications for various trademarks that have been filed in the United States, the European Community, Australia, Israel, Japan, Mexico, China, South Korea, and Taiwan. These protect the Company's name and prepare for the introduction of brand name products.

²⁷ Patent Lens search by inventors, April 2010.

INVESTMENT CONCERNS AND RISKS

For a complete description of risks and uncertainties related to NovaBay Pharmaceuticals business, see NovaBay's 10K reports, which can be accessed from the Company's website, www.novabaypharma.com. Potential risks include:

- **Stock risk and market risk:** There is a limited trading market for the Company's common stock. There can be no assurance that an active and liquid trading market will develop or, if developed, that it will be sustained, which could limit one's ability to buy or sell the Company's common stock at a desired price. Investors should also consider technical risks common to many small-cap or micro-cap stock investments, such as small float, risk of dilution, dependence upon key personnel, and the strength of competitors that may be larger and better capitalized.
- **Competitive risk:** The pharmaceutical market continues to evolve, and research and development are expected to continue. Other companies are already established players in antimicrobial markets and are actively engaged in the development of new drugs that may directly or indirectly compete with those being pursued by NovaBay. These companies may have substantially greater research and development capabilities, as well as significantly greater marketing, financial, and human resources than the Company.
- **Products still in development phases:** NovaBay's products are still at a precommercialization stage. Such products may appear to be promising, but may not reach commercialization for various reasons, including failure to demonstrate safety and efficacy in large clinical trials and/or the inability to be manufactured at a competitive cost. And even if its products are commercialized, there can be no assurance that they will be accepted by physicians, patients, or healthcare payers, which may prevent the Company from becoming profitable.
- **Funding requirements:** It is difficult to predict NovaBay's future capital requirements. The Company may need additional financing to continue funding the development of its products and their production. There is no guarantee that it can secure the desired future capital or, if sufficient capital is secured, that current shareholders will not suffer significant dilution.
- **Regulatory risk:** There is no guarantee that the Company's products will be approved by the U.S. Food and Drug Administration (FDA) or international regulatory bodies for marketing in the U.S. or abroad.
- **Patent risk:** The pharmaceutical industry is one in which patents have not always provided sufficient protection against competition. There can be no assurance that NovaBay's patents will provide sufficient protection to exclude competitors and that patent litigation will not become a financial burden.

FINANCIAL FORECASTS & VALUATION

We have used two methods to value NovaBay shares, a discounted cash flow model and a discounted price-earnings model. Our models incorporate a number of assumptions, though one that persists throughout is that NovaBay's Aganocide compounds are patent protected through 2025. As discussed in greater detail below, the two valuation methods yield similar results.

SOURCES OF REVENUE

Impetigo

Year penetration starts	2014	Incidence	220,000
Starting penetration rate	10%	Percent addressable	100%
Years between penetration start and peak	5	Market growth rate	1%
Peak penetration	35%	Price per patient	\$110
Duration of peak penetration in years	10	Treatment price growth	0%
Retention rate in decline years	90%	Royalty rate	10%
Stage of development	Phase II	Probability of commercialization	37%

Assumptions regarding Impetigo:

- The incidence of impetigo is based on the incidence reported from a sentinel practice network in England and Wales and applied to the estimated population of more developed countries of the world.^{28,29}
- An Aganocide formulation for impetigo is launched commercially in 2014 in the United States and Europe with the marketing support of Galderma. Because this market is competitive and relatively small in major developed countries, we've assumed that NovaBay receives royalties at a 10% rate on sales attributed to its partner (70% of all sales). In addition, we've assumed that the Company promotes the drug directly to hospitals and other institutions, which we've estimated comprise 30% of the overall market.
- Based on good antibacterial efficacy, the drug's market penetration rate is 10% initially and rises over a five-year period to 35%.
- The drug is priced at a 60% premium to a commonly used antibiotic, Bactroban, or \$110 per treatment and each patient is treated only once.
- The probability of commercialization is 37%, consistent with historical success rates of other medicines at a similar stage of development.

²⁸ Fleming, DM, et al. skin infections and antibiotic prescribing: a comparison of surveillance and prescribing data. Br J Gen Pract (2007); 57(540): 569.

²⁹ U.S. Census Bureau, International Database.

Acne

Year penetration starts	2015	Incidence	120,000,000
Starting penetration rate	2%	Percent addressable	11%
Years between penetration start and peak	7	Market growth rate	1%
Peak penetration	20%	Price per patient	\$850
Duration of peak penetration in years	9	Treatment price growth	0%
Retention rate in decline years	90%	Royalty rate	20%
Stage of development	Phase I	Probability of commercialization	25%

Assumptions regarding Acne:

- The number of potential acne patients is based on the American Dermatology Association's estimate of U.S. prevalence (60 million individuals) and adjusted by a factor of two to approximate overseas markets. However, the addressable market is restricted to the 11% of acne sufferers who actually visit a dermatologist for this condition.
- An Aganocide formulation for acne is launched commercially in 2015 in the United States and Europe with the marketing support of Galderma. Because this market is very competitive, we've assumed a modest penetration rate of 2% initially. But based on good antibacterial efficacy in clinical trials, the drug's market penetration rate reaches 20% over the ensuing six years.
- The drug is priced comparable to clindamycin-benzoyl peroxide in the United States (\$175) and at a 40% discount overseas. The annual price used in our model is a 50:50 blended U.S. and foreign price. Each tube is sufficient for daily applications over a two-month period.
- The probability of commercialization is 25%, consistent with historical success rates of medicines that have completed a Phase I clinical trial.
- NovaBay receives royalties at a blended rate (estimated range: 10%-30%) that increases with sales. But for our analysis, we've selected a single royalty rate of 20%, since we do not know the specific triggers that ratchet up the rate or the number of rate hikes involved.

Conjunctivitis

Year penetration starts	2014	Incidence	17,000,000
Starting penetration rate	6%	Percent addressable	100%
Years between penetration start and peak	5	Market growth rate	1%
Peak penetration	25%	Price per patient	\$60
Duration of peak penetration in years	10	Treatment price growth	0%
Retention rate in decline years	90%	Royalty rate	7%
Stage of development	Phase II	Probability of commercialization	25%

Assumptions regarding Conjunctivitis:

- The conjunctivitis patient population reflects the reported incidence rate for the infection from a one-year survey of physicians in The Netherlands and applied to the population of more developed countries, estimated by the U.S. Census Bureau.^{29,30}

³⁰ Rietveld, RP et al. Do general practitioners adhere to the guideline on infectious conjunctivitis? Results of the Second Dutch National Survey of General Practice. BMC Fam Pract (2007); 8: 54.

- Alcon launches the drug in 2014 in the United States and Europe. Its efficacy against both viral and bacterial conjunctivitis results in a good initial penetration rate of 6% and a peak penetration rate of 25% five years after launch.
- The price per patient is twice the cost (\$10 per 5 mL bottle) of a common antibiotic used for ophthalmic conditions, gentamycin. The price per patient, however, also reflects an assumption that three bottles would be required per year, since disease recurrence is relatively high.
- NovaBay receives royalties at 7% of Alcon's sales.
- The probability of commercialization is 25%, which is consistent with historical success rates for drugs that have completed a Phase I clinical trial.

Catheter-Associated Urinary Tract Infections

Year penetration starts	2012	Incidence	770,000
Starting penetration rate	2%	Percent addressable	100%
Years between penetration start and peak	8	Market growth rate	1%
Peak penetration	35%	Price per patient	\$830
Duration of peak penetration in years	8	Treatment price growth	0%
Retention rate in decline years	90%	Royalty rate	0%
Stage of development	Phase Iia	Probability of commercialization	37%

Assumptions regarding Catheter-Associated UTIs

- The number of patients with catheter-associated UTIs is based solely on the number of individuals who require permanent catheterization because of such conditions as paralysis.³¹ Hence, this number does not take into consideration the 15%-25% of hospitalized patients who may receive a short-term indwelling urinary catheter that results in 3.1-7.5 infections per 1000 catheter-days.²¹
- The addressable market is 100%, since the irrigation solution is well tolerated and has no safety issues that would prevent its use by any portion of the population.
- NovaBay launches the irrigation solution in 2012 with an emphasis on hospital use, with a resultant 2% penetration of the market. Within eight years, the solution is used by 35% of the population, based on its ability to prevent UTIs more effectively than alternative strategies.
- The price per patient is based on an assumption that the average individual with a permanent indwelling urinary catheter would require irrigation twice per week at a price of \$8 per treatment.
- The probability of commercialization is 37%, which is higher than normal for drugs that have completed only a Phase I clinical trial. We believe the higher percentage is justified, based on the safety and efficacy data achieved to date with Aganocide compounds.

³¹ NovaBay Pharmaceuticals.

Onychomycosis

Year penetration starts	2016	Incidence	101,632,400
Starting penetration rate	1%	Percent addressable	18%
Years between penetration start and peak	8	Market growth rate	1%
Peak penetration	15%	Price per patient	\$500
Duration of peak penetration in years	4	Treatment price growth	0%
Retention rate in decline years	90%	Royalty rate	11%
Stage of development	Preclinical	Probability of commercialization	10%

Assumptions regarding Onychomycosis

- The number of patients with onychomycosis was derived from the estimated incidence of nail infections reported from various clinical trials (8.3%) and applied to the population of more developed countries, as estimated by the U.S. Census Bureau.
- The addressable market is 18% of the number of individuals with nail infections, because most are unaware of their infection or seek medical assistance for it.
- NovaBay partners this Aganocide formulation after a Phase II clinical trial has been completed, and the marketing partner launches it in 2016.
- Market penetration rises from 1% to 15% within eight years of launch, based on good safety and efficacy data from clinical trials and an estimated level of competition in the marketplace.
- The price of this topical medicine is set at a level that is competitive with the generic drugs currently available to treat onychomycosis in the United States and at a one-third lower price overseas.
- NovaBay receives royalties on the product's sales at an 11% rate.
- The probability of commercialization is 10%, which is consistent with historical success rates of drugs that are entering Phase I clinical trials.

INCOME STATEMENT[#] (Fiscal year ends on December 31st.)

All figures are in thousands, except per-share data

	2010	2011	2012	2013	2014
Total revenue	\$ 12,000	\$ 15,000	\$ 31,039	\$ 41,331	\$ 74,557
COGS	-	-	1,956	5,969	9,952
Gross profit	\$ 12,000	\$ 15,000	\$ 29,083	\$ 35,362	\$ 64,605
Operating expenses					
R&D	\$ 8,000	\$ 8,000	\$ 10,000	\$ 12,000	\$ 14,166
Selling & marketing	-	4,000	6,000	7,440	13,420
General & administrative	4,000	4,000	5,000	5,500	5,965
Total expense	12,000	16,000	21,000	24,940	33,551
Operating profit	\$ -	\$ (1,000)	\$ 8,083	\$ 10,422	\$ 31,054
Non-operating income/expense					
Interest expense	(50)	(50)	-	-	-
Interest income	40	50	75	75	75
Total non-operating	(10)	-	75	75	75
Pretax profit	\$ (10)	\$ (1,000)	\$ 8,158	\$ 10,497	\$ 31,129
Income tax			3,100	3,989	11,829
Net income	\$ (10)	\$ (1,000)	\$ 5,058	\$ 6,508	\$ 19,300
Earnings (loss) per share	\$ (0.00)	\$ (0.04)	\$ 0.16	\$ 0.20	\$ 0.58
Shares outstanding	23,500	26,500	32,250	32,500	33,000

Assumptions related to the Income Statement

- In 2010 and 2011, revenues are from R&D funding agreements with Alcon and Galderma. In addition, we've assumed that NovaBay receives a \$5 million milestone from Alcon in 2011 upon commencement of a Phase III conjunctivitis clinical trial.
- The Company incurs manufacturing expenses on sales of its products through its own sales force.
- R&D expenses rise moderately in 2010. Thereafter, they increase as more products enter advanced stages of development. Starting in 2014, R&D costs equal 19% of sales.
- NovaBay begins to incur marketing expenses in 2011 as it prepares to launch its catheter irrigation solution the following year. These costs rise subsequently, reaching 22% of sales in 2013.
- General and administrative expenses approximate \$4 million in 2010 and 2011. By 2014, they equal 8% of sales.
- We've made virtually no provisions for non-operating items.
- NovaBay's effective tax rate is 38% for financial reporting purposes. However, net operating loss carryforwards, which amounted to \$40.04 million as of December 31, 2009, will limit its cash payments through 2015.
- The number of shares increases as a result of option and warrant exercises and external financing.

BALANCE SHEET (Fiscal year ends on December 31st.)

All figures are in thousands.

ASSETS	12/31/2009	12/31/2008
Current Assets		
Cash & equivalents	11,292	12,099
Accounts Receivable	3,801	-
Inventory	-	-
Other	513	414
Total Current Assets	\$ 15,606	\$ 12,513
Property & equipment	\$ 1,812	\$ 1,456
Other	105	
Total Assets	\$ 17,523	\$ 13,969
 LIABILITIES		
Current Liabilities		
Accounts payable	\$ 272	\$ 406
Debt due	371	408
Accrued liabilities	1,228	1,166
Deferred revenue	2,167	2,500
Total Current Liabilities	\$ 4,038	\$ 4,480
Deferred tax	\$ 34	\$ -
Long-term debt	106	477
Deferred revenue	-	1,667
Total Long-Term Liabilities	\$ 140	\$ 2,144
Shareholders Equity		
Common Stock, par value	\$ 233	\$ 215
Additional Paid-In Capital	37,003	33,718
Accumulated Deficit	(23,891)	(26,588)
Total Shareholders Equity	\$ 13,345	\$ 7,345
Total liabilities & equity	\$ 17,523	\$ 13,969

CAPITAL EXPENDITURE PROJECTIONS

Our estimates include one large capital expenditure project, amounting to \$15 million in 2013, for an office and laboratory complex. We have made no provision for a manufacturing plant even though NovaBay intends to supply its Aganocide compounds to Alcon and Galderma for formulation by its partners. Thus far, the Company has relied on contract manufacturers and this practice is expected to continue.

DISCOUNTED PRICE MODEL

We have used two approaches to valuing NovaBay shares a discounted price model and a DCF valuation model. In the discounted price model, we applied a price/earnings ratio of 40 to our estimate of the Company's earnings in 2014 (\$0.58 per share) and discounted that price back to the present, using a discount rate of 27. This approach yielded a share price of approximately \$9.00, which is comparable to the results obtained from our DCF valuation model, shown on the next page.

DISCOUNTED CASH FLOW ANALYSIS#

All data are in thousands, except for per-share figures

	2010	2011	2012	2013	2014
Revenue	\$ 12,000	\$ 15,000	\$ 31,039	\$ 41,331	\$ 74,557
Operating income	0	-1000	8083	10422	31054
Net income	-10	-1000	5058	6508	19300
Depreciation/amortization	350	350	375	375	400
Stock-based compensation	1100	1100	1150	1150	1200
Tax loss carryforwards	0	0	3100	3989	11829
Capital expenditures	-750	-750	-750	-15000	-1000
Asset purchases					
Other					
Total cash flow adjustments	700	700	3,875	(9,486)	12,429
Free cash flow	\$ 690	\$ (300)	\$ 8,933	\$ (2,978)	\$ 31,729
Risk-adjusted free cash flow	\$ 214	\$ (300)	\$ 2,955	\$ (2,978)	\$ 11,418

Discount Rate	Discounted Cash Flows (2008 - 2023)	PV of Terminal Value at a					
		Perpetual growth rate of rFCF			Enterprise Value		
		2.0%	3.0%	4.0%	2.0%	3.0%	4.0%
7.5%	\$251,182.14	\$ 456,575	\$ 563,507	\$ 731,543	\$707,757	\$814,689	\$982,726
10.0%	\$194,132.76	\$ 222,342	\$ 256,596	\$ 302,269	\$416,475	\$450,729	\$496,402
12.5%	\$151,682.41	\$ 120,927	\$ 134,967	\$ 152,310	\$272,610	\$286,649	\$303,992
15.0%	\$119,749.82	\$ 70,241	\$ 76,840	\$ 84,640	\$189,991	\$196,590	\$204,390
17.5%	\$95,477.38	\$ 42,668	\$ 46,058	\$ 49,950	\$138,145	\$141,535	\$145,427

Discount Rate	Net Debt	Total Equity Value			Value per Diluted Share		
		2.0%	3.0%	4.0%	2.0%	3.0%	4.0%
		7.5%	\$ (10,815)	\$718,572	\$825,504	\$993,541	\$ 21.77
10.0%	(10,815)	\$427,290	\$461,544	\$507,217	\$ 12.95	\$ 13.99	\$ 15.37
12.5%	(10,815)	\$283,425	\$297,464	\$314,807	\$ 8.59	\$ 9.01	\$ 9.54
15.0%	(10,815)	\$200,806	\$207,405	\$215,205	\$ 6.09	\$ 6.29	\$ 6.52
17.5%	(10,815)	\$148,960	\$152,350	\$156,242	\$ 4.51	\$ 4.62	\$ 4.73

Discount Rate	Terminal Value as % Enterprise Value			Implied EBITDA Multiple		
	2.0%	3.0%	4.0%	2.0%	3.0%	4.0%
	7.5%	64.5%	69.2%	74.4%	11.42	14.09
10.0%	53.4%	56.9%	60.9%	7.85	9.06	10.67
12.5%	44.4%	47.1%	50.1%	5.98	6.67	7.53
15.0%	37.0%	39.1%	41.4%	4.83	5.28	5.82
17.5%	30.9%	32.5%	34.3%	4.05	4.37	4.74

Assumptions related to the DCF Analysis:

- The DCF model projects cash flow through 2025, discounted back at multiple annual rates (7.5%, 10.0%, 12.5%, 15.0%, and 17.5%) to demonstrate the potential variability related to this assumption. It also includes three perpetual growth rates (2%, 3%, and 4%) to show the impact on the present value of the company's terminal value. The rates used in calculating the per-share value for NovaBay are a 12.5% annual discount rate and a perpetual growth rate of 3%. The number of fully-diluted shares estimated to be outstanding in 2014, 33 million, is used in the per-share calculation.
- The cash flows are risk adjusted, based on the gross profit contribution by each drug or indication on an annual basis and the probability of that therapy being commercialized as assumed. For any years in which we are projecting negative cash flow, the probability is conservatively set at 100%.

DISCLOSURES

ANALYST(S) CERTIFICATION: The analyst(s) responsible for covering the securities in this report certify that the views expressed in this research report accurately reflect their personal views about NovaBay Pharmaceuticals (the “Company”) and its securities. The analyst(s) responsible for covering the securities in this report certify that no part of their compensation was, is, or will be directly or indirectly related to the specific recommendation or view contained in this research report.

MEANINGS OF RATINGS: Our rating system is based upon 12 to 36 month price targets. **BUY** describes stocks that we expect to appreciate by more than 20%. **HOLD** describes stocks that we expect to change plus or minus 20%. **SELL** describes stocks that we expect to decline by more than 20%. **SC** describes stocks that Griffin Securities has **Suspended Coverage** of this Company and price target, if any, for this stock, because it does not currently have a sufficient basis for determining a rating or target and/or Griffin Securities is redirecting its research resources. The previous investment rating and price target, if any, are no longer in effect for this stock and should not be relied upon. **NR** describes stocks that are **Not Rated**, indicating that Griffin Securities does not cover or rate this Company.

DISTRIBUTION OF RATINGS: Currently Griffin Securities has assigned BUY ratings or NO RATINGS on all of the companies it covers. The Company has provided investment-banking services for 16% of companies in which it has had BUY ratings in the past 12 months, 0% for companies in which it has had NR or no coverage in the past 12 months or has suspended coverage (SC) in the past 12 months.

MARKET MAKING: Griffin Securities does not maintain a market in the shares of this Company or any other Company mentioned in the report.

COMPENSATION OR SECURITIES OWNERSHIP: The analyst(s) responsible for covering the securities in this report receive compensation based upon, among other factors, the overall profitability of Griffin Securities, including profits derived from investment banking revenue. The analyst(s) that prepared the research report did not receive any compensation from the Company or any other companies mentioned in this report in connection with the preparation of this report. Keith A. Markey, one of the analysts responsible for covering the securities in this report, currently owns common stock in the Company, and in the future the analyst(s) may from time to time engage in transactions with respect to the Company or other companies mentioned in the report. Griffin Securities from time to time in the future may request expenses to be paid for copying, printing, mailing and distribution of the report by the Company and other companies mentioned in this report. Griffin Securities expects to receive, or intends to seek, compensation for investment banking services from the Company in the next three months.

PRICE CHART – 2 Year



4/21/2010 – Initiating Coverage: share price: \$2.50; rating: BUY; 12-month price target: \$9.00

FORWARD-LOOKING STATEMENTS: This Report contains forward-looking statements, which involve risks and uncertainties. Actual results may differ significantly from such forward-looking statements. Factors that might cause such a difference include, but are not limited to, those discussed in the “Risk Factors” section in the SEC filings available in electronic format through SEC Edgar filings at www.SEC.gov on the Internet.

GENERAL: Griffin Securities, Inc. (“Griffin Securities”) a FINRA (formerly known as the NASD) member firm with its principal office in New York, New York, USA is an investment banking firm providing corporate finance, merger and acquisitions, brokerage, and investment opportunities for institutional, corporate, and private clients. The analyst(s) are employed by Griffin Securities. Our research professionals provide important input into our investment banking and other business selection processes. Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients that reflect opinions that are contrary to the opinions expressed herein, and our proprietary trading and investing businesses may make investment decisions that are inconsistent with the recommendations expressed herein.

Griffin Securities may from time to time perform corporate finance or other services for some companies described herein and may occasionally possess material, nonpublic information regarding such companies. This information is not used in preparation of the opinions and estimates herein. While the information contained in this report and the opinions contained herein are based on sources believed to be reliable, Griffin Securities has not independently verified the facts, assumptions and estimates contained in this report. Accordingly, no representation or warranty, express or implied, is made as to, and no reliance should be placed on, the fairness, accuracy, completeness or correctness of the information and opinions contained in this report.

The information contained herein is not a complete analysis of every material fact in respect to any company, industry or security. This material should not be construed as an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. We are not soliciting any action based on this material. It is for the general information of clients of Griffin Securities. It does not take into account the particular investment objectives, financial situations, or needs of individual clients. Before acting on any advice or recommendation in this material, clients should consider whether it is suitable for their particular circumstances and, if necessary, seek professional advice. Certain transactions - including those involving futures, options, and other derivatives as well as non-investment-grade securities - give rise to substantial risk and are not suitable for all investors. The material is based on information that we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied on as such. The information contained in this report is subject to change without notice and Griffin Securities assumes no responsibility to update the report. In addition, regulatory, compliance, or other reasons may prevent us from providing updates.

DISCLOSURES FOR OTHER COMPANIES MENTIONED IN THIS REPORT: To obtain applicable current disclosures in electronic format for the subject companies in this report, please refer to SEC Edgar filings at www.SEC.gov. In particular, for a description of risks and uncertainties related to subject companies’ businesses in this report, see the “Risk Factors” section in the SEC filings.