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Company Update
Healthcare

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PetVivo Holdings, Inc. (PETV - $1.82 - Buy)

Right Pieces in Place to Drive Sales

Key Points

Operational Highlights for Fiscal 2022. The company raised gross proceeds of $11.25 million in a NASDAQ up-list in August 2021. In the last two quarters, the company generated more than $100K in sales in the rebranded product Spryng. The company launched two websites – sprynghealth.com and petvivo.com – with sprynghealth.com specifically targeted at veterinarians. The company has engaged Colorado State University and Ethos Veterinary Health, a private clinical research organization, to conduct canine tolerance efficacy studies over the next several quarters. The company has a seasoned management team in place to help drive sales.

Financials. The company raised net proceeds of $9.8 million in August 2021. This provided the necessary capital for the company to commercialize Spryng, which began in September 2021. On March 31, 2022, the company had $6.1 million in cash and cash equivalents and working capital of $5.6 million. PetVivo increased inventory to $98K to support expected revenue growth in 2023. The company continues to expand sales and marketing efforts and clinical studies to gain acceptance and increase revenues from the sale of Spryng.

Distribution Service Agreement. PetVivo entered into a distribution service agreement with MWI Veterinary Supply Co. (MWI), a subsidiary of AmerisourceBergen (ABC). MWI is one of the largest distributors of veterinary products in the world, with over 400 Territorial Managers in the United States. This distribution agreement creates a partnership with MWI, which will expand the awareness of Spryng and allow PetVivo to benefit from the vast educational and training resources of MWI. This relationship further provides an expansive introduction of Spryng with OsteoCushion Technology within the United States to veterinary physicians. The company anticipates distribution or shipment by the second half of August 2022. We expect the product to be shipped to multiple distribution centers in the United States for MWI.

Clinical Studies. PetVivo continues to conduct additional trials or studies to gain better acceptance of Spryng. PetVivo entered into a clinical trial service agreement with Colorado State University in November 2020 to evaluate Spryng when injected into elbows. The study has commenced – enrollments of dogs have picked up, and the company expects this study to be complated in November 2023. PetVivo also entered into a canine clinical study with Ethos Veterinary Health in May 2022, with an anticipated completion date by March 2023. This pilot study will help evaluate the intraarticular injection of Spryng in dogs suffering from Stifle disease. The study is to initially demonstrate product tolerance and then efficacy.

Summary

The company expects a revenue mix starting with a majority of equine revenues first, and then small animal revenues. The company has attracted influential equine vets throughout the U.S., and these vets have been using the product. The company is getting positive feedback from the vets about the disruptiveness of the product. The company will have supporting data from private organizations to be available much earlier than the Colorado State data. This will further help attract small animal vets to use the product. The company is leveraging investments in developing human therapeutics to commercialize treatments for pets in a capital and time-effective manner. This strategy's centerprice is accelerating time to revenues for veterinary medical devices. Medical devices enter the market earlier than the more regulated veterinary pharmaceuticals or human therapeutics. The company's biomaterials have been through a human clinical trial and have been classified as a medical device for use as a dermal filler. The FDA does not require submission of a 510(k) or pre-market approval for medical devices used in veterinary medicine.

Rating, Price and Target	
Symbol	PETV
Rating	Buy
Price	$1.82
Price Target	$7.00
Market Data	
Market Cap (M)	$18.20
Shares Outstanding (M)	10.00
Average Daily Volume (000s)	270.00
Float (M)	5.40
Total Debt (M)	$0
Net Cash/Debt ($M)	$5.80
Dividend	NM

FYE Mar	2022A	2023E	2024E
EPS[1]	(0.57)	(0.91)	(0.75)
Previous	*(0.56)*	*(0.94)*	*(0.75)*
Revenue (M) ($)	0.1	1.7	10.7

[1]Shares retroactively restated for 1-for-4 reverse stock split in December of 2020.

Quarterly EPS	Q1	Q2	Q3	Q4
2022A	(0.07)	(0.13)	(0.17)	(0.21)
2023E	(0.23)	(0.25)	(0.23)	(0.21)
2024E	-	-	-	-

Quarterly Revenue (M)	Q1	Q2	Q3	Q4
2022A	0.0	0.0	0.1	0.1
2023E	0.1	0.2	0.5	0.9
2024E	-	-	-	-

Company Description

PetVivo is an emerging biomedical device company currently focused on the manufacturing, commercialization, and licensing of innovative medical devices and therapeutics for animals. The company's strategy is to leverage human therapies for the treatment of dogs and horses in a capital and time-efficient way. PetVivo has a pipeline of seventeen products for the treatment of animals and people. A portfolio of twenty-one patents protects the company's biomaterials, products, production processes, and methods of use. The company's lead product is SPRYNG, a veterinarian-administered intraarticular injection for the management of lameness and joint afflictions, such as osteoarthritis, in dogs and horses. The company is headquartered in Minneapolis, Minnesota.

Right Pieces in Place to Drive Sales

Overview

PetVivo is an emerging biomedical device company focused on manufacturing, commercializing, and licensing of innovative medical devices and therapeutics for companion animals. The company's strategy is to leverage human therapies for the treatment of companion animals in a capital and time-efficient way. A key component of this strategy is the accelerated timeline to revenues for veterinary medical devices, which enter the market much earlier than more stringently regulated pharmaceuticals and biologics[1].

PetVivo's product SPRYNG™ with OsteoCushion™ technology is a protein particle matrix injected into the synovial space of a joint to manage lameness and other joint-related afflictions, including osteoarthritis, in companion animals. Spryng is a veterinary medical device injected into any articulating joint that functions in cooperation with synovial fluid to provide a lubricious cushion, which augments and reinforces existing cartilage. The product is comprised of similar proteins found in natural cartilage – collagen and elastin. Spryng was launched in September 2021.

Figure 1. PetVivo Holdings, Inc. - Highlights

Focus on estimated $11B companion animal veterinary care and product sales market
Spryng™, with our OsteoCushion™ Technology, is a veterinary device that mimics and reinforces articulating cartilage tissue for the management of lameness and other joint-related afflictions including osteoarthritis
Spryng comprises the same components & structure as natural cartilage to provide additional support and functionality to protect the joint from pain
Drive revenue and traffic for Veterinarians; better outcomes and cost for pet owners
Strong IP portfolio with ten U.S. and nine foreign issued patents
FDA premarket approval or clearance is not required for medical devices used in veterinary medicine
Experienced Management Team and Board of Directors

Sources: Company Reports

Operational Highlights for Fiscal 2022

The company raised gross proceeds of $11.25 million in a NASDAQ up-list in August 2021. In the last two quarters, the company generated over $100K in sales in the rebranded product Spryng.

The company launched two websites - sprynghealth.com and petvivo.com – with sprynghealth.com specifically targeted at veterinary space.

The company has engaged Colorado State University and Ethos Veterinary Health, a private clinical research organization, to conduct canine tolerance efficacy studies over the next several quarters. The company has a seasoned management team in place to help drive sales.

Financials

The most significant event in fiscal 2022 was an up listing to NASDAQ in which the company raised net proceeds of $9.8 million in August 2021. This provided the necessary capital for the company to commercialize Spryng, which began in September 2021.

On March 31, 2022, the company had $6.1 million in cash and cash equivalents and working capital of $5.6 million. PetVivo increased inventory to $98K to support expected revenue growth in 2023. The company continues to use net proceeds from the IPO to expand sales and marketing efforts and clinical studies to gain acceptance and increase revenues from the sale of Spryng.

Distribution Service Agreement

PetVivo entered into a distribution service agreement with MWI Veterinary Supply Co. (MWI), a subsidiary of AmerisourceBergen (ABC)[2]. MWI is one of the largest distributors of veterinary products in the world, with over 400 Territorial Managers in the United States.

This distribution agreement creates a partnership with MWI, which will expand the awareness of Spryng and allow PetVivo to benefit from the vast educational and training resources of MWI. This relationship further provides an expansive introduction of Spryng with OsteoCushion Technology within the United

[1] PetVivo Holdings, Inc. 10-K June 24, 2022
[2] PetVivo Holdings, Inc. 8-K June 24, 2022

States to veterinary physicians. The company anticipates distribution or shipment by the second half of August 2022. We expect the product to be shipped to multiple distribution centers in the United States for MWI.

Clinical Studies

PetVivo continues to conduct additional trials or studies to gain better acceptance of Spryng.

Many national distributors such as MWI like to see third-party university studies before they include a product in their catalog. The company expects more clinical data about the efficacy of Spryng that will help it gain more acceptance within the veterinary space.

PetVivo entered into a clinical trial service agreement with Colorado State University on November 5, 2020, to evaluate Spryng when injected into elbows. It was a double-blind elbow study. Because of COVID, it was delayed significantly. But the study has commenced – enrollments of dogs have picked up, and the company expects the completion of this study in November 2023.

PetVivo also entered into a canine clinical study with Ethos Veterinary Health in May of 2022, with an anticipated completion date in fiscal 2023 or by March 2023. This pilot study will help evaluate the intraarticular injection of Spryng in dogs suffering from Stifle disease. The study is to initially demonstrate product tolerance and then eventually efficacy.

Summary

The company expects a revenue mix starting with a majority of equine revenues first, and then small animal revenues.

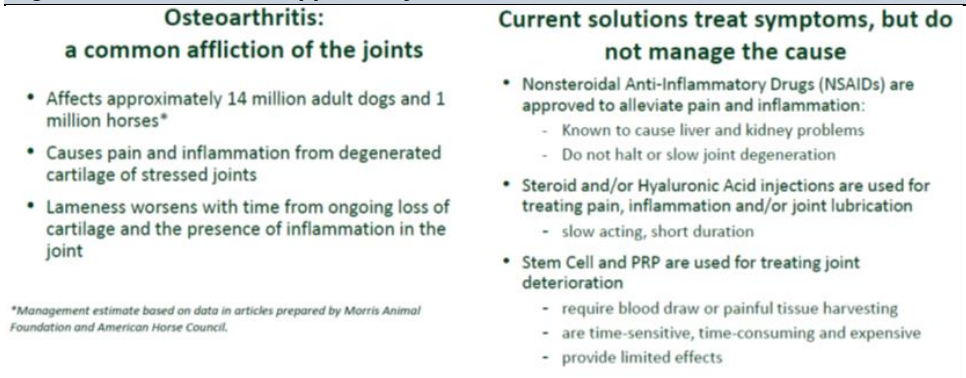
The company has attracted influential equine vets throughout the U.S., and these vets have been using the product. The company is getting positive feedback from the vets about the disruptiveness of the product. The company is also getting repeat orders from these vets who are also evaluating the product.

The company will have supporting data from private organizations to be available much earlier than the Colorado State data. This will further help attract small animal vets to use the product.

The company is leveraging investments in developing human therapeutics to commercialize treatments for pets in a capital and time-effective manner. This strategy's centerprice is accelerating time to revenues for veterinary medical devices. Medical devices enter the market earlier than the more regulated veterinary pharmaceuticals or human therapeutics.

The company's biomaterials have been through a human clinical trial and have been classified as a medical device for use as a dermal filler. The FDA does not require submission of a 510(k) or pre-market approval for medical devices used in veterinary medicine.

Figure 2. Osteoarthritis Opportunity



Sources: Company Reports and ThinkEquity estimates

Target Available Market

Osteoarthritis is a major cause of pain, disability, and lameness in dogs. Current treatment protocols mainly include non-steroidal anti-inflammatory drugs (NSAIDs), anti-nerve growth factor monoclonal antibodies[3]. Physical activity moderation or restriction, weight control and nutraceuticals, aim to alleviate symptoms and disease progress, with surgical treatments being applied in severe cases[4]. The significant health and welfare burden of OA on veterinary patients is strongly influenced by the epidemiology of the

[3] Enomoto et al. Vet Rec. 2019
[4] Sanderson et al. Vet Rec. 2009

disease globally. In the United Kingdom, there is an estimated annual prevalence of 2.5-6.6% of dogs of different age and breeds, based on primary veterinary care data[5]. The reported prevalence in North America is age-specific, with 20% of patients being over 1 year of age, and 80% of them being over 8 years old[6].

Demand-Pull

Spryng is sold to veterinary doctors, which allows the veterinary doctors to derive revenue as well as increase traffic. It also offers the pet owner desired outcomes by addressing the cause of the affliction, lost or damaged cartilage, rather than simply treating the symptoms.

The product on a single interarticular injection lasts at least 12 months or longer.

Fewer Regulatory Hurdles

The product was developed as a medical device for the human market, so the company gets an exemption on the animal health side. Companion animal use is supported by an underlying 145 human patients FDA dermal filler clinical trial.

The biomaterials have been through a human clinical trial and have been classified as a medical device for use as a dermal filler[7]. The FDA does not require submission of a 510(k) for medical devices used in veterinary medicine.

The company does not have to go to the FDA for pre-market approval or clearance before commercially selling the product as a medical device. The company has submitted the labeling and claims, and the FDA has not commented on it in more than three years.

Osteoarthritis Opportunity

Osteoarthritis is bone-on-bone contact, with the wearing away of the cartilage. The bone-on-bone contact causes inflammation and pain. The problem worsens over time, and it does not improve. In the United States, approximately 14 million dogs and a million horses have this condition.

Standard of Care

The gold standard treatment currently is NSAIDs. But there are multiple issues with NSAIDs - GI tract bleeding, kidney, and liver damage. Also, NSAIDs do not slow down the degrading of the joint.

The next line of treatment is steroids and hyaluronic acid, which work but are slow-acting for a short duration. This entails multiple treatments each year, requiring the pet owner's compliance to bring the dog back to the veterinary doctor.

Cell therapies are considered disruptive technologies. But they can still be regarded as experimental to a certain level in an environment where more evidence on the subject is needed.

Cell Therapy for the Treatment of Osteoarthritis in Canine Patients

Regenerative medicine and stem cell research represent a disruptive technology that brings innovative approaches to the treatment of unmet clinical needs and an opportunity to study diseases from a novel perspective on a cellular and molecular level[8]. Their disruptive nature is particularly evident in the emergence of a new generation of veterinary medicinal products for clinical use. With new opportunities come challenges that affect directly all stakeholders involved in the field, including private and public research institutions, veterinary healthcare professionals, industry, and regulatory agencies. The integration of traditional medical and surgical treatments with stem cell therapies is of scientific, clinical and public interest, especially for the treatment of chronic degenerative diseases where currently symptom modifying treatments are the only therapeutic option[9].

The use of cell therapies for the management of OA has shown promising pre-clinical and clinical results in canine patients[10]. This has given rise to a range of canine cell-based products for the treatment of joint disease available on the market. However, few are underpinned by robust assessment of safety and efficacy in well-designed clinical trials. Furthermore, the lack of stringent regulatory guidelines for veterinary cell-based products has allowed clinics and companies to operate in a commercial environment, relying on preliminary pre-clinical and clinical data and poorly defined, unstandardized manufacturing protocols.

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[5] Anderson et al. Sci Rep. 2018
[6] Johnston et al. Vet Clin North Am Small Anim Pract. 1997
[7] PetVivo Holdings, Inc. 10-K June 24, 2022
[8] Banda et al. Clin Ther. 2018
[9] Ivanovska et al. Front. Vet. Sci. June 2022
[10] Harman et al. Front Vet Sci. 2016

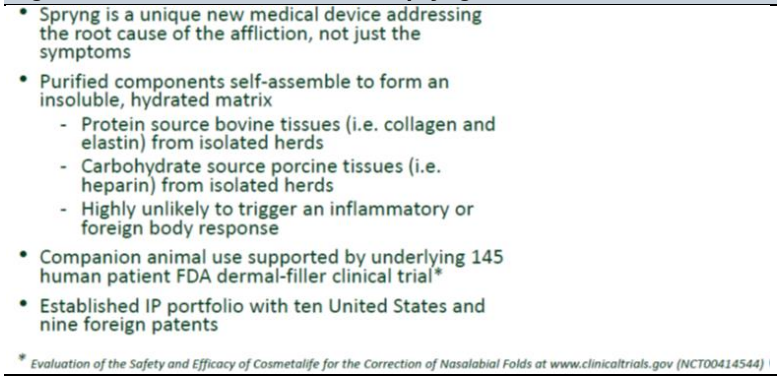
These issues give rise to several important concerns. Firstly, the use of unproven cell therapies lacking clinical validation represents a potential risk to the health of veterinary patients. Secondly, the absence of clear and rigorous quality standards for veterinary cell products signifies a possible vulnerability that could impact both manufacturers and practitioners. Thirdly, an unregulated market lacking transparency permits unproven and potentially unsafe therapies to gain traction. Finally, the absence of appropriate pharmacovigilance systems guided by international consensus and oversight, means that adverse events will potentially be unmonitored and unreported.

In the near future, the number of canine cell-based products on the market will most likely increase, as this technology continues to grow and develop. It is therefore vital that manufacturing procedures are highly controlled during the research and development of such products, encouraging reproducible high standards of manufacture so that clinical outcomes can be reliably evaluated.

Spryng Particles in Synovial Fluid Act to Augment and Reinforce Cartilage

Spryng particles have been evaluated as a method to address the issues created by injured joints. Spryng particles are injected into the synovial joint to work in cooperation with synovial fluid to augment and reinforce natural cartilage. Since the particles are lubricious and spongy, they provide a slippery cushion to the joint space, much like natural cartilage mechanically provides. Also, because the particles do not dissolve and are too big to pass through the pores of the synovium, they last to provide joint protection for a year or longer. In contrast, hyaluronan, which will augment the synovial fluid to make it more slippery and alleviate joint pain, will only last in the joint space for a short time, and the protective joint effects wear off too soon (weeks).

Figure 3. Osteoarthritis Solution: Spryng with OsteoCushion Technology



Sources: Company Reports and ThinkEquity estimates

Osteoarthritis in Dogs

Osteoarthritis in dogs is a slowly progressive, degenerative, and dynamic disease, which can cause notable signs of pain, lameness, and disability. Reportedly, 20% of the canine population more than one year old has some degree of osteoarthritis[11].

Management of osteoarthritis typically involves a multi-modal approach, which can include one or more of the following: activity control; weight management; nutritional support; physical therapy; and administration of nonsteroidal anti-inflammatory drugs, analgesic medications, nutraceuticals, disease-modifying osteoarthritic agents, and injectable medical devices (e.g., Spryng).

Management of osteoarthritis in dogs is a lifetime commitment, involves a multimodal approach, aims at reducing pain and improving mobility and quality of life.

Equine Osteoarthritis

Although osteoarthritis has been reported in wild horses and may be a feature of old age, most OA seen in horses occurs in younger animals and is post-traumatic. Chronic treatment includes exercise modification, mobility exercises, weight control, joint support products (e.g., Spryng, hyaluronan, polysulfated glycosaminoglycans, ACS), and arthrodesis of selected joints.

The early diagnosis of OA remains elusive, and the process is usually at an advanced stage by the time it is detectable radiographically. It is important to treat joint inflammation aggressively and allow the tissues the necessary time to repair before inflicting more damage.

[11] Roush et al. Vet Med 2002

Value Proposition

The Spryng injection augments and protects the joint, and many pet owners see tangible improvement of the dog within 48 hours. The osteoarthritic solution has an excellent safety profile from the human study and is minimally invasive. It's typically administered once a year, costing between $500 and $700. The company is also seeing pet insurance coverage.

Manufacturing Facility

The company has built up an ISO 5, ISO 7, and ISO 8 production facility, with the capacity for large-scale production. Essentially a human standards medical device production facility. The company has done thousand-unit batch runs. The batch runs take about eight days, with the capability to run concurrent batch runs. Within approximately six months, the company can produce in each batch run about 5,000 units. The facility can produce approximately 500,000 syringes a year, representing revenues of about $120 million.

IP Portfolio

The company has a comprehensive IP portfolio, nineteen US patent patents, and foreign patents. The company also has strong protocols in place to protect trade secrets. Trade secrets, many times, are more valuable than the patents. There is a lot of detail in manufacturing, which gives the company a competitive edge.

Demographic drivers

Fewer people are getting married, and fewer people have children. Pets are becoming stand-ins for children, the humanization of the pet into the family. Pet owners will spend whatever it takes to improve the animal's quality of life. Veterinary care represents 30% of pet spending today, growing at 7% annually.

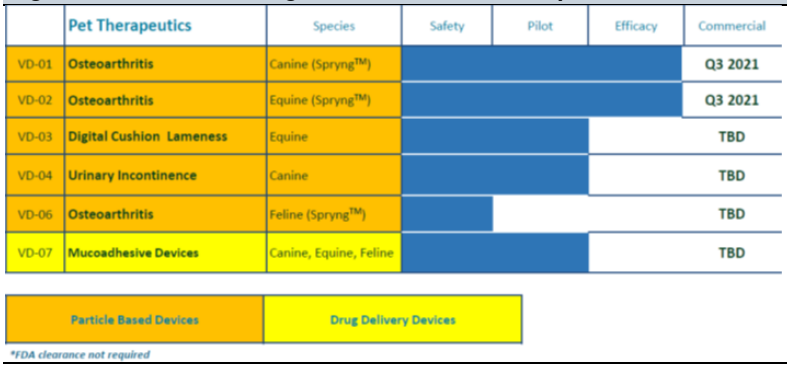
Pet Insurance

Pet insurance is a rapidly growing market, averaging 23% annual growth. It still represents under 4% of the pet population. The market is ripe for disruptive effective therapy, and the company's product is getting reimbursement. The company's approach addresses the issue of bone-on-bone contact and is focused on creating a cushion and protection between the joints.

Product Pipeline

The company is developing multiple applications using the osteo cushion particles, Spryng. The first products do not require any FDA clearance and are ready for commercialization. The first in the commercialization stage the canine Spryng, and equine Spryng. The feline Spryng is expected within six months.

Figure 4. PetVivo Holdings, Inc. – Pet Product Pipeline*



Sources: Company Reports and ThinkEquity estimates

Market Awareness

The company has 50 veterinarians as word of mouth for marketing to attract distributors. The company can increase market awareness through trade shows, white papers, and digital. The company has a clinical study ongoing at Colorado State. This is not an FDA study but a marketing study, with results expected soon.

Financials

Net proceeds from the August 2021 capital raise were $9.8 million. We expect the company to step up marketing to support the product rollout. At the forecast cash burn, the current estimated cash position of $6.1 million should support operations through the fourth calendar quarter of 2022.

We forecast revenues to grow from $1.7 million in FY 2023 to $10.7 million by FY 2024. We are modeling for gross margins to expand from 40% to 70% over the same time. We expect operating loss to improve from $10.5 million in fiscal 2023 to $8.5 million in fiscal 2024.

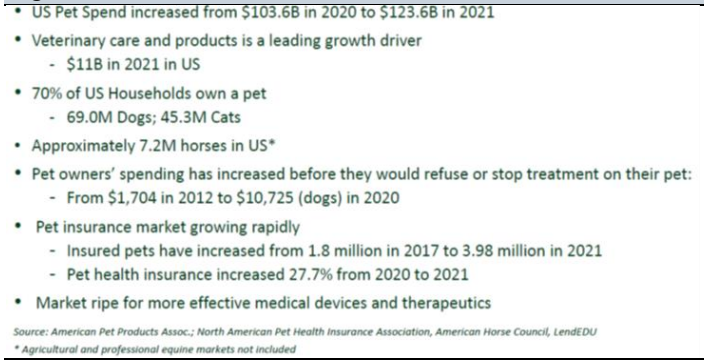
Summary.

The company has mitigated FDA risk, and scaling the business is not a constraint. An estimated 40% of the capital raise will be focused on sales and marketing. The company has a strong international and domestic IP portfolio.

Company Overview

PetVivo is a veterinary biotech and biomedical device company headquartered in Minneapolis, Minnesota. The company's primary business is commercializing and licensing products in the veterinary market to treat companion animals such as dogs and horses.

Figure 5. Market Overview



Sources: Company Reports and ThinkEquity estimates

The technology was developed for human biomedical applications, and the company intends to leverage the investments to commercialize treatments for pets. The company's products are derived from natural tissue building blocks - collagen, elastin, and heparin - that simulate a body's cellular tissue.

These naturally occur in the body and have biocompatibility with living tissues compared to synthetic biomaterials. These protein-based biomaterials mimic the body's tissue allowing integration and tissue repair in long-term implantation for certain applications.

The initial product, Spryng, is a veterinary device designed to help reinforce articular cartilage tissue to aid in the management of osteoarthritis in companion animals. Spryng uses an intra-articular injection of non-dissolving, cartilage-like patented particles to enhance the force cushioning function of the synovial fluid. The particles mimic natural cartilage in composition, structure, and hydration[12].

Osteoarthritis is a chronic, progressive, degenerative joint disease caused by a loss of synovial fluid or the deterioration of joint cartilage. It is estimated that there are over 20 million dogs with osteoarthritis in the United States and the European Union with market size of $2.6 billion and over 1 million lame horses in the US for a $600 million the United States and the European market[13].

Spryng compares favorably to existing treatments to safely improve joint function in animals.

[12] PetVivo Holdings, Inc. S-1/A March 22, 2021
[13] Johnston et al. Joint Anatomy, Physiology, and Pathobiology 1997

Figure 6. Spryng and Competitive Treatments

Product	Spryng	NSAIDs	Polysulfated Glycosamino-glycan	Conversion Electron Therapy	Hyaluronic Acid Injections	Polyacrylamide Injections	Joint Replacement
Pro	Protects Joint, Increases Activity, Reduces Pain, Excellent Safety Profile	Temporary Pain Relief	Reduces inflammation; Pain Relief	Reduces synovitis and chronic pain	Temporary Pain Relief	Increases Lubricity in the Joint	Total Joint Replaced
Con	Minimally invasive	Potential for gastric ulcers and kidney problems; does not treat condition	Minimally invasive; effective for 3-4 days	Minimally invasive; radioactive materials; toxic in other applications	Effectiveness diminishes over 30 days - Minimally invasive	Minimally Invasive	Invasive and expensive surgical procedure requiring rehabilitation
Dosing/ Treatment	Typically injected once per year	Once or twice daily by owner	Twice weekly for 4 weeks; repeat as needed	Injected once per year	Monthly injection at vet clinic	Typically injected once per 4 - 12 months	Surgery and Rehab
Annual Owner Cost	$600 - $900	$400 - $1,440	$600 - $1,200	$1,995	$600 - $900	$350 - $1,400	$5,000 - $8,000

Sources: Company Reports and ThinkEquity estimates

Spryng addresses the underlying problem, which relates to bones contacting each other and a lack of synovial fluid. Spryng provides a biocompatible lubricious cushion to the joint, which establishes a barrier between the bones, thereby protecting the remaining cartilage and bone.

Spryng is easily administered with the standard intra-articular injection technique. Case studies indicate canines may have a multi-month improvement in lameness after treatment with Spryng.

With a Spryng injection, canines can discontinue the use of NSAIDs and eliminate the negative side effects.

Spryng is an effective and economical solution for treating osteoarthritis. A single injection of Spryng is approximately $600 to $900 per joint and typically lasts about 12 months.

Historically, drug sales represent a third of revenues at a typical veterinary practice (www.veterinarypracticenews.com). Revenues and margins at veterinary practices are being eroded with veterinary prescription competition from online, big-box, and traditional pharmacies. Veterinary practices are looking for ways to replace lost prescription revenues with safe and effective products. Spryng is veterinarian-administered and should expand practice revenues and margins[14].

Spryng is classified as a veterinary medical device under the United States FDA rules, and the FDA does not require pre-market approval. Spryng completed a safety and efficacy study on rabbits in 2007. Since, more than 800 horses and dogs have been treated with Spryng.

The company entered into a clinical trial services agreement with Colorado State University in November 2020. This is a 12-month study to be primarily used to expand distribution outlets. Large distributors require a third-party university study before including a product in their catalog. Due to delays caused by COVID 19, the clinical study is expected to be completed by the end of 2023. The company plans to commercialize Spryng with in-house marketing personnel and outside distributors.

The commercialization strategy is for an initial launch in key regional markets – Colorado, Minnesota, and Texas – in the third quarter of fiscal 2022 and continue expansion into fiscal 2023 as the Company adds regional sales managers. The strategy includes developing alliances with distributors in fiscal 2023. The company has built out an ISO 5, ISO 7, and ISO 8 certified facility in Minneapolis, that can handle projected production in units for the next five years.

The company expects to grow its product pipeline through the acquisition or in-licensing of additional proprietary products from human medical device companies for use in pets.

[14] PetVivo Holdings, Inc. S-1 July 2021

Figure 7. PetVivo Holdings, Inc. – Growth Drivers

Sources: Company Reports and ThinkEquity estimates

Canine Osteoarthritis

Osteoarthritis in dogs is a slowly progressive, degenerative, and dynamic disease, which can cause notable signs of pain, lameness, and disability. Reportedly, 20% of the canine population more than one year old has some degree of osteoarthritis[15].

Multiple etiologies have been suspected of contributing to the formation of osteoarthritis, including defective articular cartilage structure and biosynthesis, joint trauma, joint instability, congenital and developmental abnormalities, and inflammatory conditions[16].

Management of osteoarthritis typically involves a multimodal approach, which can include one or more of the following: activity control; weight management; nutritional support; physical therapy; and administration of nonsteroidal anti-inflammatory drugs, analgesic medications, nutraceuticals, disease-modifying osteoarthritic agents, and injectable medical devices (e.g., Spryng).

Over the past two decades, numerous treatment options have become available to the clinician for managing osteoarthritis in dogs. Ultimately, the decision is based on a multimodal treatment approach, patient response, and client factors such as cost and willingness to medicate. The cost-benefit ratio for some clients is a huge factor regarding the use of medical interventions.

Quality of Evidence

Quality of evidence is an important consideration when making a therapeutic decision as it is the best predictor of consistent clinical outcomes. The highest level of evidence consists of systematic reviews (meta-analyses) and well-designed, properly randomized, controlled, patient-centered clinical trials (RCCTs). A lower grade denotes a moderate level of evidence, consisting of well-designed, non-RCCTs, epidemiological studies (cohort, case-control), models of disease, and dramatic results in uncontrolled studies. The lowest level of evidence encompasses expert opinions, descriptive studies, studies in non-target species, pathophysiologic findings, and in vitro studies. Few reports have been made reviewing the quality of evidence of treatments for osteoarthritis in companion animals[17].

[15] Roush et al. Vet Med 2002
[16] McLaughlin et al. Vet Clin North Am Small Anim Pract 2000
[17] Sanderson et al. the Veterinary Record 2009

Figure 8. The Evidence Pyramid

Sources: Sanderson et al. Vet Record 2009. Note. The quality of evidence increases as it nears the top of the pyramid, giving the clinician the strongest confidence of diagnostic and treatment response

Spryng to Treat Osteoarthritis

Spryng is a veterinary medical device designed to help augment and reinforce articular cartilage tissue to treat and prevent osteoarthritis in companion animals. Spryng uses an intra-articular injection of non-dissolving, cartilage-like patented particles to enhance the force cushioning function of the synovial fluid to treat lameness and other joint-related afflictions, including osteoarthritis or hip dysplasia. The veterinarian simply injects the material into the synovial joint space using standard intra-articular injection techniques. Multiple joints can be treated simultaneously. There are no special post-injection treatment requirements

The particles in Spryng are comprised of collagen, elastin, and heparin, similar to components found in natural cartilage. These particles show effectiveness in augmenting the cartilage and enhance the functionality of the joint.

Once injected, the extent of bone-on-bone contact is lessened, and results are typically seen within days. In-vivo studies indicate that Spryng can be combined with synovial fluid in a rabbit knee to form a joint cushion, buffering the adjacent bones and cartilage.

Figure 9. Spryng Technology

- Spryng is a unique new medical device addressing the root cause of the affliction, not just the symptoms
- Purified components self-assemble to form an insoluble, hydrated matrix
  - Protein source bovine tissues (i.e. collagen and elastin) from isolated herds
  - Carbohydrate source porcine tissues (i.e. heparin) from isolated herds
  - Highly unlikely to trigger an inflammatory or foreign body response
- Companion animal use supported by underlying 145 human patient FDA dermal-filler clinical trial*
- Established IP portfolio with ten United States and nine foreign patents

* *Evaluation of the Safety and Efficacy of Cosmetalife for the Correction of Nasalabial Folds at www.clinicaltrials.gov (NCT00414544).*

Sources: Company Reports and ThinkEquity estimates

Spryng biomaterials simulate a body's cellular tissue by relying upon natural protein compositions incorporating tissue building blocks - collagen, elastin, and heparin.

Since these naturally occur in the body, we believe they have enhanced biocompatibility with living tissues compared to synthetic biomaterials. These protein-based biomaterials mimic the body's tissue, allowing integration and tissue repair in long-term implantation in certain applications.

The Spryng components self-assemble to form an insoluble, slippery, wet permeable, durable, and resilient matrix. The components mimic natural cartilage in composition, structure, and hydration. These spongy augmentation particles mimic the protective function of cartilage – providing a slippery cushion and

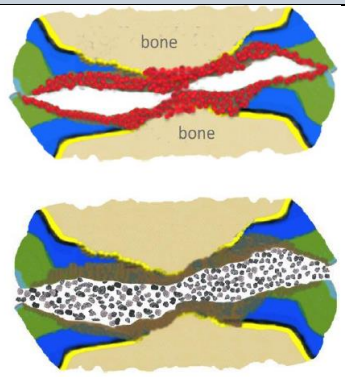
a protective barrier between bones. Spryng augments the synovial membrane function without pharmacologic, chemical, or metabolic action.

Mechanism of Action

Spryng particles work in cooperation with the synovial fluid to augment and reinforce cartilage to protect the joint as a mechanical and scaffolding where needed. Particles conform to the synovial space and act as sponges to absorb and release synovial fluid in response to mechanical forces during articulation to provide long---term, safe, lubricious cushions like cartilage tissue. The particles protect joints like natural cartilage and provide a scaffold to help joint tissue heal.

Figure 10. Spryng - Mechanism of Action

- An animal suffering from osteoarthritis generally exhibits damaged and/or lost cartilage thereby creating bone on bone contact that results in an increase of joint inflammation, pain and further loss of cartilage
- Spryng reinforces synovial membrane function, without pharmaceutical, chemical or metabolic action
- Biocompatible Spryng particles are lubricious, "cushioning" and reside in joint synovial space
- These spongy reinforcing particles mimic the protective function of cartilage – providing both a slippery cushion and a protective barrier between bones
- Particles are slippery, wet, permeable, durable and resilient
- Particles resemble natural cartilage in composition, structure, hydration and function



Sources: Company Reports and ThinkEquity estimates

Valuation

We forecast revenues to grow from $1.7 million in fiscal 2023 to $10.7 million in fiscal 2024. Over the same time, we expect operating loss to improve from $10.5 million to $8.5 million.

Our 12-month price target of $7 is 7x sales per share forecast for fiscal 2024. This valuation multiple is in line with the peer group valuation range (Figure 15).

Risk factors to our investment thesis and price target. PetVivo has minimal prior experience in the marketing, selling, and distributing pet care products. If the marketing, advertising, and trade promotions are not successful in creating and sustaining consistent revenue growth, operations could be adversely affected.

Financial Results

Results of Operations – For Fiscal Year Ended March 31, 2022 (FY 2022)

Revenues increased to $116K in fiscal 2022 compared to $13K in fiscal 2021 and consisted of sales to veterinary clinics. The Company began commercialization of its Spryng product in September 2021.

Figure 11. PetVivo Holdings, Inc. – Operational Summary

	For Fiscal Year Ended March 31,	
	2022	**2021**
(EPS per share data)		
Statements of Operations:		
Revenues	$ 115,586	$12,578
Total cost of sales	201,154	10,695
Total Operating Expenses	4,970,960	1,960,871
Total Other Income (Expense)	41,533	(1,563,792)
Net Loss	(5,014,995)	3,522,780
Net loss per share - basic and diluted*	$ (0.57)	$ (0.57)

**Shares retroactively restated for 1-for-4 reverse stock split in December of 2020*

Sources: Company Reports and ThinkEquity Estimates

The cost of sales was $201,154 in fiscal 2022 compared to $10,695 for fiscal 2021. The increase is directly related to increased sales of the Spryng product.

Cost of sales includes product costs related to the sale of products and labor and overhead costs. The increase and the negative gross margin are primarily attributed to product costs and product launch expenses from the commercialization of Spryng in September 2021.

Operating expenses increased to $4.9 million in fiscal 2022 compared to $1.9 million in fiscal 2021. Operating expenses include G&A, sales and marketing, and research and development expenses.

The increase is primarily due to increased G&A expenses and sales and marketing expenses related to the sale of Spryng product. G&A expenses were $3.1 million and $1.8 million in fiscal 2022 and 2021, respectively.

Sales and marketing expenses were $1.3 million and $95K in fiscal 2022 and 2021, respectively.

R&D expenses were $475K and $98K in fiscal 2022 and 2021, respectively. The increase was related to clinical studies and efforts to support the launch of Spryng.

Operating loss was $5.1 million and 1.9 million in fiscal 2022 and 2021, respectively. The increase was primarily related to the costs to support the launch of Spryng.

The net loss in fiscal 2022 was $5.0 million compared to a net loss of $3.5 million in fiscal 2021.

Liquidity

Net Cash Used in Operating Activities

The company used $4.2 million of net cash in operating activities in fiscal 2022. This cash used in operating activities was primarily attributable to the net loss of $5.0 million.

Net Cash Used in Investing Activities

The company used $183K of net cash in investing activities in fiscal 2022, which included the purchase of equipment of $154K.

Net Cash Provided by Financing Activities

During fiscal 2022, the company received net cash of $10.4 million from financing activities consisting of $10.2 million in stock and warrants sale proceeds.

Figure 12. PetVivo Holdings, Inc. – Cash Flows

	For the Year Ended	
(,000)	March 31, 2022	March 31, 2021
Net cash used in operating activities	$ (4,175)	$ (767)
Net cash used in investing activities	(183)	(160)
Net cash provided by financing activities	10,441	940
Cash and Cash Equivalents at end of period	6,107	24

Sources: Reuters, Company Reports, and ThinkEquity Estimates

Capital Resources

Net proceeds from the Public Offering on August 13, 2021 were $9.8 million.

As of March 31, 2022, current assets were $6.8 million, including $6.1 million in cash and cash equivalents. In comparison, current liabilities as of that date were $1.2 million, including $1.1 million in A/P and accrued expenses. The working capital as of March 31, 2022 was $5.6 million.

Figure 13. PetVivo Holdings, Inc. – Balance Sheet Summary

	As of	
(in 000, except par value)	March 31, 2022	March 31, 2021
Cash and cash equivalents	$ 6,107	$ 24
Inventory, net	98	-
Total current assets	6,755	147
Property, plant and equipment	312	214
Total assets	7,427	835
Total current liabilities	1,173	1,405
Total liabilities	1,441	1,732
Acccumulated Deficit	(63,126)	(58,111)
Total stockholders' equity (deficit)	5,987	(897)
Working Capital	5,582	(1,258)

Sources: Company Reports and ThinkEquity Estimates

Summary

The company has mitigated FDA risk, and scaling the business is not a constraint. We forecast the expenditures on sales and marketing to increase from $5.0 million in FY 2023 to $8.0 million in FY 2024. The company has a strong international and domestic IP portfolio.

Risks

Operational Losses

For the year ended March 31, 2022, the company lost $5 million without any significant commercial revenues. The company had an accumulated deficit of $63 million. To achieve and sustain future revenues, the company must succeed in commercializing Spryng to treat dogs and horses suffering from osteoarthritis.

Sufficient Funding

As of March 31, 2022, the company had cash or cash equivalents of $6.1 million. The cash on hand will be adequate to satisfy operational requirements for the next ten months.

Success of Spryng

The company's efforts and financial resources have primarily been directed toward the commercialization of the Spryng products for treating dogs and horses suffering from osteoarthritis. The prospects rely on the successful launch and follow-up marketing of this product.

Competition

The company faces competition from pharmaceutical, biotechnology, and specialty animal health medical companies. Competitors include Zoetis, Merck Animal Health (Merck & Co), Merial (Sanofi, S.A.), Elanco (Eli Lilly and Company), Bayer Animal Health (Bayer AG), Novartis Animal Health (Novartis AG), Boehringer Ingelheim Animal Health; Virbac Group; Ceva Animal Health; Vetaquinol; and Dechra Pharmaceuticals PLC. Earlier stage animal health companies' competitors include Kindred Bio, Aratana Therapeutics, Next Vet, and VetDC.

The company's efforts and financial resources will continue to focus on commercializing Spryng products. The business strategy plan includes identifying additional animal care products to license, acquire or develop, and then commercializing such products into a branded product portfolio along with Spryng products.

Clinical advancement of products

There is no assurance that clinical trials or studies of Spryng will demonstrate statistically significant safety and efficacy. Failure to show efficacy or adverse results in clinical trials or studies could impact the business.

The company entered into canine clinical study agreements with Colorado State University on November 25, 2020 and Ethos Veterinary Health in May of 2022. The company may engage other third parties to conduct studies of Spryng and has limited control over the timing and resources that such third parties will devote to the studies.

Raw Materials

The company depends on independent third parties to produce the raw materials - collagen, elastin, and heparin. The Company has limited marketing and sales organization. If current marketing and sales personnel are insufficient or inadequate to support the introduction of Spryng products, the company may not be able to sell these products in quantities to become commercially successful.

Limited Marketing and Sales Organization

The company has a limited marketing and sales organization. PetVivo has minimal prior experience in the marketing, sale, and distribution of pet care products.

If the marketing, advertising, and trade promotions are not successful in creating and sustain consistent revenue growth, the results of operations could be adversely affected.

Ownership and Control of the Company

As of June 1, 2022, officers and directors beneficially own or control 30% of outstanding shares of common stock. Due to this ownership concentration, management can control all matters requiring stockholder approval.

Common Stock has been a Penny Stock under SEC rules

In the past, the common stock was a penny stock under applicable SEC rules. If the company does not continue to satisfy the requirements to be exempt from the penny stock rules, it will be more difficult to resell its securities.

For additional risk considerations, please refer to the company's SEC filings.

Figure 14. PetVivo Holdings, Inc. - Income Statement, FY2020-2024E

March Fiscal Year end		Jun-21	Sep-21	Dec-21	Mar-22		Jun-22	Sep-22	Dec-22	Mar-23		
(USD, EPS per share data) [1]	**FY2021**	1Q22	2Q22	3Q22	4Q22	**FY2022**	1Q23	2Q23	3Q23	4Q23	**FY2023E**	**FY2024E**
Revenues	$ 12,578	$ 4,145	$ 4,977	$ 51,004	$ 55,460	$ 115,586	$ 60,000	$ 240,000	$ 500,000	$ 900,000	$ 1,700,000	$ 10,700,000
Cost of Sales	10,695	5,051	-	98,997	97,106	201,154	70,000	200,000	350,000	400,000	1,020,000	3,210,000
Gross Profit (Loss)	1,883	(906)	4,977	(47,993)	(41,646)	(85,568)	(10,000)	40,000	150,000	500,000	680,000	7,490,000
Margin							*-17%*	*17%*	*30%*	*56%*	*40%*	*70%*
Operating Expenses												
Sales and Marketing	94,977	49,731	235,767	404,462	657,625	1,347,585	900,000	1,100,000	1,400,000	1,600,000	5,000,000	8,000,000
General and administrative	1,767,664	330,945	756,186	1,170,870	890,493	3,148,494	1,100,000	1,300,000	1,400,000	1,500,000	5,300,000	7,000,000
Research and development	98,230	136,937	116,380	34,326	187,238	474,881	270,000	285,000	195,000	150,000	900,000	950,000
Total Operating Expenses	1,960,871	517,613	1,108,333	1,609,658	1,735,356	4,970,960	2,270,000	2,685,000	2,995,000	3,250,000	11,200,000	15,950,000
Operating Loss	(1,958,988)	(518,519)	(1,103,356)	(1,657,651)	(1,777,002)	(5,056,528)	(2,280,000)	(2,645,000)	(2,845,000)	(2,750,000)	(10,520,000)	(8,460,000)
Total Other Income (Expense)	(1,563,792)	27,890	(2,118)	15,522	239	41,533	-	-	-	-	-	-
Net Loss before Taxes	(3,522,780)	(490,629)	(1,105,474)	(1,642,129)	(1,776,763)	(5,014,995)	(2,280,000)	(2,645,000)	(2,845,000)	(2,750,000)	(10,520,000)	(8,460,000)
Income Tax Provision	-	-	-	-	-	-	-	-	-	-	-	-
Net Loss	(3,522,780)	(490,629)	(1,105,474)	(1,642,129)	(1,776,763)	(5,014,995)	(2,280,000)	(2,645,000)	(2,845,000)	(2,750,000)	(10,520,000)	(8,460,000)
Net profit (loss) per share, diluted	$ (0.57)	$ (0.07)	$ (0.13)	$ (0.17)	$ (0.21)	$ (0.57)	$ (0.23)	$ (0.25)	$ (0.23)	$ (0.21)	$ (0.91)	$ (0.75)
Weighted average common shares outstanding - diluted	6,198,717	6,945,353	8,749,233	9,756,945	9,591,977	8,760,877	10,000,000	10,700,000	12,600,000	12,800,000	11,600,000	11,250,000

[1]Shares retroactively restated for 1-for-4 reverse stock split in December 2020

Sources: Company Reports and ThinkEquity Estimates

Figure 15. PetVivo Holdings, Inc. —Valuation Comparable, Prices as of 7/18/2022

(Amounts listed in USD. Numbers in millions, except per share data)

				Enterprise Value as a Multiple of:							Price as a Multiple of:		Projected	
				Sales			EBITDA			EBIT	CY+1	CY+2	EPS	PEG
Company	**Stock Price** [1]	**Market Value of Equity**	**Enterprise Value**[2]	**LTM**	**CY+1**	**CY+2**	**LTM**	**CY+1**	**CY+2**	**LTM**	**EPS**	**EPS**	**Growth**	**Ratio**
Merck & Co., Inc.	92.34	233,509.9	256,441.9	4.75x	4.42x	4.50x	11.7x	10.5x	10.5x	13.8x	12.5x	12.4x	11.5%	1.1x
Zoetis Inc.	171.76	80,835.2	84,395.2	10.70	10.18	9.38	26.0	23.6	21.4	29.7	33.9	30.0	11.0%	2.7
Eli Lilly and Company	321.77	289,644.3	303,755.9	10.36	10.45	9.98	29.2	29.5	26.3	34.6	38.5	34.0	15.9%	2.1
Bayer Aktiengesellschaft	56.37 [3]	55,375.0	90,480.7	1.92	1.84	1.81	9.3	7.0	6.8	10.8	7.4	6.9	5.3%	1.3
Novartis AG	84.06	182,570.0	195,354.0	3.69	3.72	3.62	10.9	10.9	10.2	15.2	13.8	12.4	5.3%	2.3
Sanofi	101.54 [3]	126,963.5	139,833.2	3.41	3.32	3.19	11.9	10.1	9.8	15.5	12.9	12.4	9.4%	1.3
Virbac SA	372.69 [3]	3,148.3	3,070.7	2.84	2.60	2.45	14.8	13.8	12.5	17.7	25.3	22.6	0.0%	NM
Dechra Pharmaceuticals PLC	44.17 [4]	4,788.2	5,019.8	6.53	5.97	5.53	29.9	21.0	19.4	40.2	29.9	27.5	9.3%	2.9
Vetoquinol SA	128.13 [3]	1,515.6	1,461.1	2.76	2.59	2.45	13.4	12.2	11.3	17.6	23.0	21.2	34.0%	0.6
High				10.70x	10.45x	9.98x	29.9x	29.5x	26.3x	40.2x	38.5x	34.0x	34.0%	2.9x
Average				5.22	5.01	4.77	17.5	15.4	14.2	21.7	21.9	19.9	11.3%	1.8
Median				3.69	3.72	3.62	13.4	12.2	11.3	17.6	23.0	21.2	9.4%	1.7
Low				1.92	1.84	1.81	9.3	7.0	6.8	10.8	7.4	6.9	0.0%	0.6
PetVivo Holdings, Inc.	**1.66**	**16.6**	**10.8**	**93.49x**	**8.29x**	**1.28x**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**0.0%**	**NM**

(1) Financial data provided by S&P CapIQ, Google Finance. Company Reports and ThinkEquity estimates as of 07/18/2022

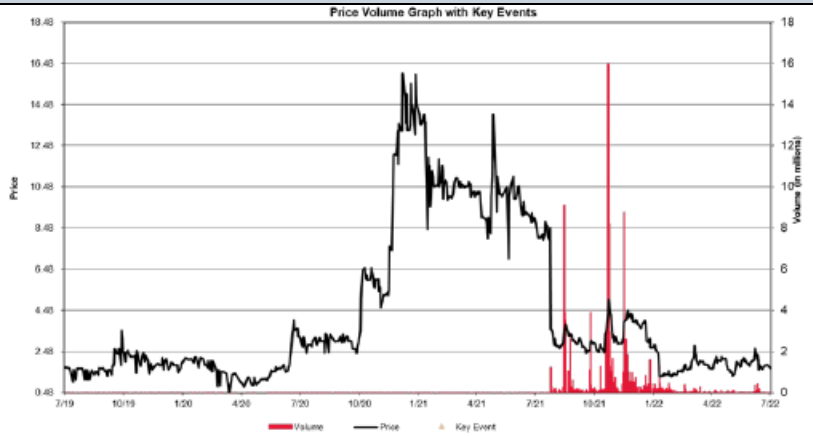
(2) Calculated as Market Value of Equity plus total debt, non-controlling interest and preferred stock, less cash & equivalents.

(3) Converted to USD from EUR at an exchange rate of 1.017.

(4) Converted to USD from GBP at an exchange rate of 1.199.

Sources: S&P CapIQ, Google Finance, Company Reports and ThinkEquity Estimates

Figure 16. PetVivo Holdings, Inc. – 3 Year Price Target and Rating History



Date	Key Development
10/11/2021	PetVivo Holdings, Inc. Initiate w/ Buy. PT $7

Sources: Thomson Reuters, Google Finance, and ThinkEquity Estimates.

Important Disclosures

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HOLD (H) - Total return expected to be in-line with S&P 500

SELL (S) - Total return expected to underperform S&P 500 by at least 10%

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This Equity Ratings Distribution reflects the percentage distribution for rated equity securities for the twelve month period June 30, 2019 through June 30, 2020. Within the twelve month period ended June 30, 2020, ThinkEquity, LLC has provided investment banking services to 54% of companies with equity rated a Buy, 0% of companies with equity rated a Hold and 0% of companies with equity rated a Sell. As of June 30, 2020, ThinkEquity, LLC had twenty-three stocks under coverage: Buy 23 (100%), Hold 0 (0%), Sell 0 (0%).

ThinkEquity rating distribution by percentage (as of July 25, 2022):			
All companies under coverage:		All companies under coverage to which it has provided investment banking services in the previous 12 months:	
Buy (1)	100.00%	Buy (1)	61.67%
Hold (2)	0.00%	Hold (2)	0%
Sell (3)	0.00%	Sell (3)	0%