Intrexon Corporation BUY

Company Update : Biotechnology

Good News for Intrexon Investors

Production of another high-value hydrocarbon has been achieved via a genetically modified bacterium. This program, which is part of the Intrexon Energy Partnership, has created a new version of a methanotroph that produces a 15-carbon molecule called farnesene. That achievement came after the first modified methanotroph was created to produce the 4-carbon molecule isobutanol. At the center of this success is Intrexon's UltraVector® technology for rapidly making genetic modifications. The two hydrocarbons are commercially important as they are used as chemical intermediates for a broad range of products and as components of gasoline (isobutanol) and jet fuel (farnesene).

Intrexon plans to expand its presence in the food industry through an acquisition of privately owned Trans Ova Genetics. The deal, which is expected to close in the September quarter, will garner the U.S. leader in bovine productive technologies, notably embryo transfer and in vitro fertilization. Trans Ova earned $4.9 million on sales of $63.3 million in 2013, largely from supplying bovine embryos from elite dairy cows and cattle. As such, it stands to benefit from the Intrexon-Ova Science joint venture's technology that should greatly increase embryo availability. Moreover, Intrexon will have the opportunity to expand Trans Ova's business into international markets and into additional species, such as pigs and sheep. Of course, the acquisition will also provide a platform for improving the genetics of these animals, much as Aqua Bounty does for fish, in order to help meet the growing demand for animal protein worldwide.

Trans Ova comes at an attractive price, in our opinion. The acquisition will be consummated via an upfront payment of $60 million in cash, $30 million in Intrexon common stock, and deferred payments of up to $20 million. Thus, the Company will pay about 1.7 times revenue to gain immediate entry into the global dairy and cattle markets that produced about $350 billion of products in 2010 and are projected to expand 58% by 2050. Just as important, the acquisition will provide Intrexon with cloning technology that should facilitate the introduction of genetically modified livestock.

We are enthusiastic over the latest developments at Intrexon. Accordingly, we are maintaining our BUY recommendation and $40 a share price target.

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Stock Symbol	**NYSE: XON**
Current Price	$23.66
12 mos. Target Price	$40.00
Market Cap	$2,337.6 mln
Shares O/S	98.8 mln
Avg Daily Vol. (3 mos.)	811,443 shs.
52- Week Price Low/High	$13.13 - $38.50
P/B	5.6x
Dividend / Yield	$0.00 / 0.0%

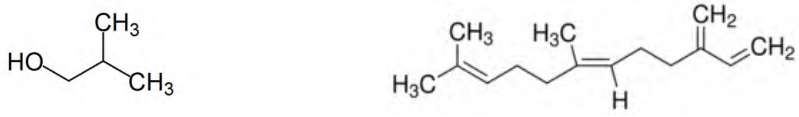
EPS

	FY 13A	FY 14E	FY 15E
Q1 (Mar)	**(0.47)A**	**0.04A**	**—**
Q2 (Jun)	**(0.07)A**	**(0.28)E**	**—**
Q3 (Sep)	**0.16A**	**(0.09)E**	**—**
Q4 (Dec)	**(0.13)A**	**(0.07)E**	**—**
	(0.46)A	**(0.41)E**	**(0.15)E**

INTREXON'S ENERGY PROGRAM ADVANCES

Intrexon announced an important development in its energy program that is financed by Intrexon Energy Partners. The Company has genetically modified a methanotroph (i.e., a microbe that uses methane as a food source) to synthesize a second, high-value molecule called farnesene. This 15-carbon compound is significantly larger than the four-carbon isobutanol that was its first compound synthesized via genetic engineering. The structures of these compounds are compared in Figure 1.

Figure 1. Molecular Structures of Isobutanol and Farnesene



Though different molecularly, the two compounds have some commonalities. For one, both can be used as fuels, isobutanol as a component of gasoline and farnesene in jet fuel. Moreover, both are chemical intermediates of multiple downstream products. For instance, farnesene is used in the manufacture of fragrances and such specialty chemicals as solvents, adhesives, surfactants, emulsifiers, resins, and coatings/sealants. Farnesene is also one of the chemicals that give beer its flavor. Similarly, isobutanol is a precursor to flavorings used by the food industry. It is used in the manufacture of coatings, paint, plastics, synthetic fibers, rubber, and ink. Thus, Intrexon is creating molecules with multiple high-value commercial applications from a relatively inexpensive and plentiful feedstock, methane that can even be obtained from biomass.

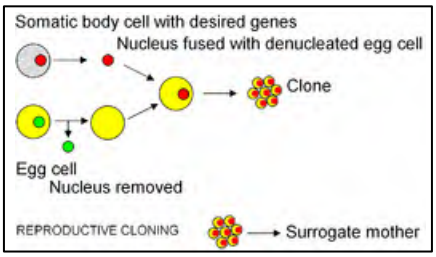
We understand that Intrexon Energy Partners includes among its investors experts in the energy industry. Hence, they are in a position to advise the Company on the avenues to pursue and the point at which the technology can be outlicensed for an attractive return on the investment.

MOVING AGGRESSIVELY INTO THE FOODS INDUSTRY

Intrexon has offered to purchase a privately owned company, Trans Ova Genetics, to gain a stronger foothold in the foods industry. The target company is the largest supplier of bovine embryos in the United States with 21 locations, largely in the central states, in addition to the corporate headquarters. Trans Ova had sales of $63.3 million in 2013 and earned a profit of $4.9 million, largely from embryo transfer and in vitro fertilization services. The deal, which should be completed in the current quarter, will afford Intrexon three opportunities to improve the existing business: First, OvaXon, which is the joint venture between Intrexon and Ova Science, will license its technology to Trans Ova to increase the yield of eggs from high-quality cows. That should increase the availability of embryos and reduce production costs, thereby improving the profitability of Trans Ova. Intrexon will also be able to expand the newcomer's business into overseas markets. And finally, the embryo production technology should be transferrable to other species.

These opportunities should not be limited by regulatory hurdles, since they do not involve genetic modification. However, given Intrexon's focus on synthetic biology, it is likely that it will eventually introduce genetically improved animal strains. We believe such animals will meet with less regulatory resistance than the genetically modified fish created by the AquaBounty subsidiary, since the primary issue there seems to be related to the potential impact should the fish escape into the wild. (Actually, there is no risk to wild fish populations since AquaBounty fish are sterile. Yet, the debate amongst the regulators continues.) But then, Trans Ova offers a genetic preservation and cloning service that accounts for a small proportion of its business. This process involves taking a small tissue sample from an elite donor animal and preserving the DNA for cloning to prevent the loss of the animal's DNA or to use it to endow an expanded heard with superior traits. Somatic cell nuclear transfer, which may ultimately play an important role in Trans Ova's technology portfolio, involves the replacement of the DNA of an unfertilized egg with the complete genetic makeup of the selected animal, as shown in Figure 2.

Figure 2. Somatic Cell Nuclear Transfer [1]



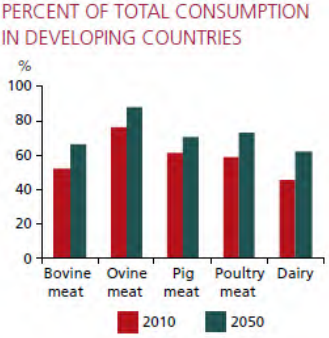
Trans Ova's subsidiary Viagen is the only U.S. patent holder to the somatic cell nuclear transfer process that is used for animal cloning. Indeed, a Federal Court recently upheld a decision that clones are not patentable, but that the somatic cell nuclear transfer process is patent protected. The cloning procedure has been used by the dairy and cattle industries, as well as horse breeders. But it is also available for pigs, sheep, and goats. Note that the FDA and U.S. Department of Agriculture have deemed that meat and milk from cloned animals is no different from traditionally bred animals and therefore requires no special regulatory consideration.

This process yields identical animals that have normal reproductive capacities. In a study involving nearly 2,000 procedures that produced more than 9,200 bovine embryos, Trans Ova scientists have shown that the clones exhibit the same reproductive capability as their genetic donors.[2]. Moreover, the company has also demonstrated the technique does not increase the risk of disease transfer.[3]

The dairy and beef industry offers Intrexon an enormous opportunity to improve food production. In 2010, the worldwide production of cow milk amounted to $180 billion and cattle meat generated $172 billion of sales.[4] Moreover, projections indicate that the world's expanding human population will require 58% more dairy products and bovine meat by 2050 on a global basis and in developing countries. (See Figure 3.)

Figure 3. Projected Consumption of Meat and Dairy Products [4]

	2010	2020	2030	2050	2050/2010
	(million tonnes)				
WORLD					
All meat	268.7	319.3	380.8	463.8	173%
Bovine meat	67.3	77.3	88.9	106.3	158%
Ovine meat	13.2	15.7	18.5	23.5	178%
Pig meat	102.3	115.3	129.9	140.7	137%
Poultry meat	85.9	111.0	143.5	193.3	225%
Dairy not butter	657.3	755.4	868.1	1 038.4	158%
DEVELOPING COUNTRIES					
All meat	158.3	200.8	256.1	330.4	209%
Bovine meat	35.1	43.6	54.2	70.2	200%
Ovine meat	10.1	12.5	15.6	20.6	204%
Pig meat	62.8	74.3	88.0	99.2	158%
Poultry meat	50.4	70.4	98.3	140.4	279%
Dairy not butter	296.2	379.2	485.3	640.9	216%



But beef and dairy products are not the only types of animal-derived foods that will need to be produced in greater quantity. Indeed, larger amounts of sheep, pig, and poultry meat will be needed to satisfy the world's needs,

[1] Source: www.scidai.ly/articles/plants_animals/genetically_modified/

[2] Polejaeva, IA, et al. Longitudinal study of reproductive performance of female cattle produced by somatic cell nuclear transfer. PLoS ONE (2013); 8(12): e84283.

[3] Gregg, K, et al. Large scale in vivo risk assessment of bovine viral diarrhea irus (BVDV) transmission through transfer of bovine embryos produced via somatic cell nuclear transfer (SCNT). Theriogenology (2010); 74(7): 1264.

[4] FAO. 2011. World Livestock 2011 – Livestock in food security. Rome, FAO.

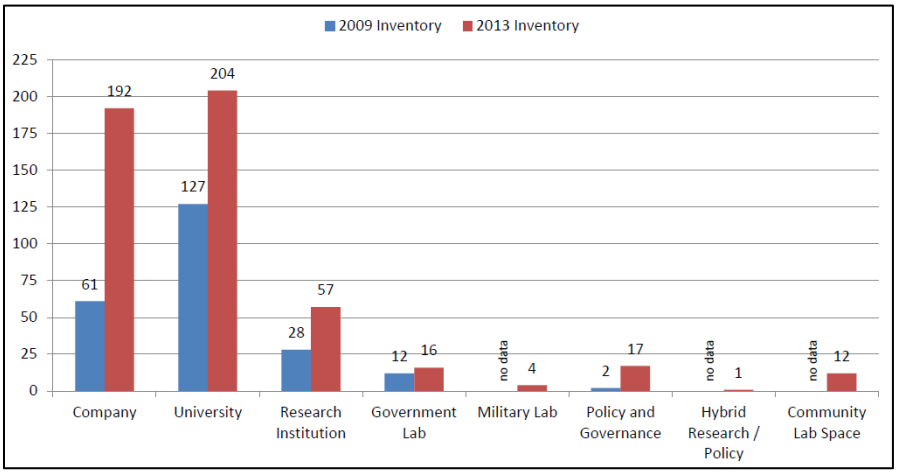
particularly in today's developing countries. Meat prices are expected to increase as demand rises, but another factor that could play a role will be the availability of livestock protein, including protein from other sources such as fish. Through proper selection, it seems possible that meat prices can be restrained by increasing protein content and/or livestock production rates. Besides its work for the dairy and beef industries, Trans Ova Genetics has demonstrated its ability to use somatic cell nuclear transfer for pig production, and the original technique was used to clone sheep.[5]

To improve food quality and quantity, traits such as animal size, feed efficiency, and disease resistance would help to increase the production of the listed species and the rate of protein production, much as AquaBounty has done with its genetically modified salmon. For other purposes, it may be useful to introduce a gene(s) that confer a specific, desirable trait. We note that scientists recently created a sheep high in omega-3 fatty acids.[6] Human milk proteins (i.e., α-lactalbumin, lactoferrrin, and lysozyme) have also been expressed in cow milk, demonstrating the feasibility of producing milk that poses less threat of eliciting an allergic response than today's commercial milk.[7] Recombinant human lysozyme has also been expressed in pig milk, since elevated levels of the enzyme acts as an antimicrobial protein that enhances immune function in pigs. At this juncture, it is premature to speculate on the nature of genetic modifications that might be undertaken for commercial purposes or even on the species that may be involved. However, the combination of Intrexon's genetic engineering technology, OvaXon's egg harvesting expertise, and Trans Ova's cloning and distribution capabilities will create a formidable competitor in the development of improved livestock to address the world's future food needs.

INVESTMENT CONSIDERATIONS

As events of the past 12 months attest, Intrexon is a rapidly evolving corporation that is committed to solving the world's many challenges through synthetic biology. Its multiple technology platforms and collaborations for the development of new products underpin its leading position in the emerging field of synthetic biology. Interest is growing, though, as evidenced by the numbers of corporations and other entities that have entered the field in the past four years.[8] (See Figure 4.)

Figure 4. Entities Conducting Research in Synthetic Biology Worldwide (2009 & 2013) [8]



The United States leads the world in investments in synthetic biology, with 312 of the world's 508 research centers identified in 2013. Europe was a distant second, followed by the Asia/Oceania region. The areas in which synthetic biology is being applied worldwide cover a broad range of commercial industries, as shown in Figure 5. (Note that the figure is based on data from 108 designers/manufacturers and some are involved in more than one application.)

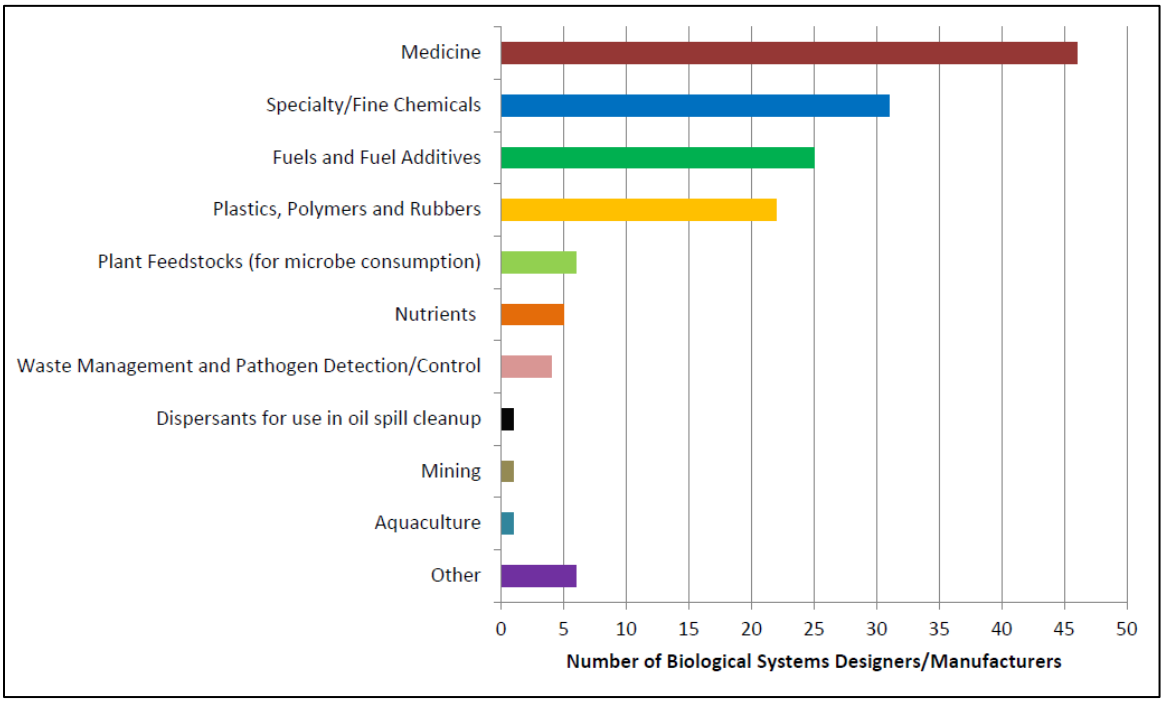
[5] Williams, NE, et al. A comparison of reproductive characteristics of boars generated by somatic cell nuclear transfer to highly related conventionally produced boars. Cloning Stem Cells (2006); 8(3): 130.

[6] Zhang, P, et al. Handmade cloned transgenic sheep rich in omega-3 fatty acids. PLoS ONE (2013); 8(2): e55941.

[7] Zhang, R, et al. Comprehensive assessment of milk composition in transgenic cloned cattle. PLoS ONE (2012); 7(11): e49697.

[8] The Wilson Center. Tracking the growth of synthetic biology: Findings for 2013.

Figure 5. Application Focus of Global Synthetic Biology Research [8]



The research being conducted by the entire spectrum of participants resembles the work that is ongoing at Intrexon. Medical applications have attracted the greatest attention, followed by specialty/fine chemicals and then fuels/fuel additives. The only areas in which the Company has not been actively engaged, to our knowledge, are Plant feedstocks, Dispersants for use in oil spill cleanup, and Mining.

We consider the new developments at Intrexon to be significant advances through a state-of-the-art R&D program and implementation of a savvy business development strategy. Our financial model will be updated for the acquisition after the deal has been consummated. Investors should realize that Trans Ova will become one of several acquisitions that Intrexon has made and that two recently acquired assets, MediStem and a laboratory in Europe, are performing well. Hence, the integration of Trans Ova should proceed smoothly.

Since our report of May 9, the Company's stock price has rebounded markedly, much as we'd expected, but we believe there is considerable appreciation potential remaining. As a result, we are maintaining our BUY rating on XON stock and our 12-month price target of $40 per share.

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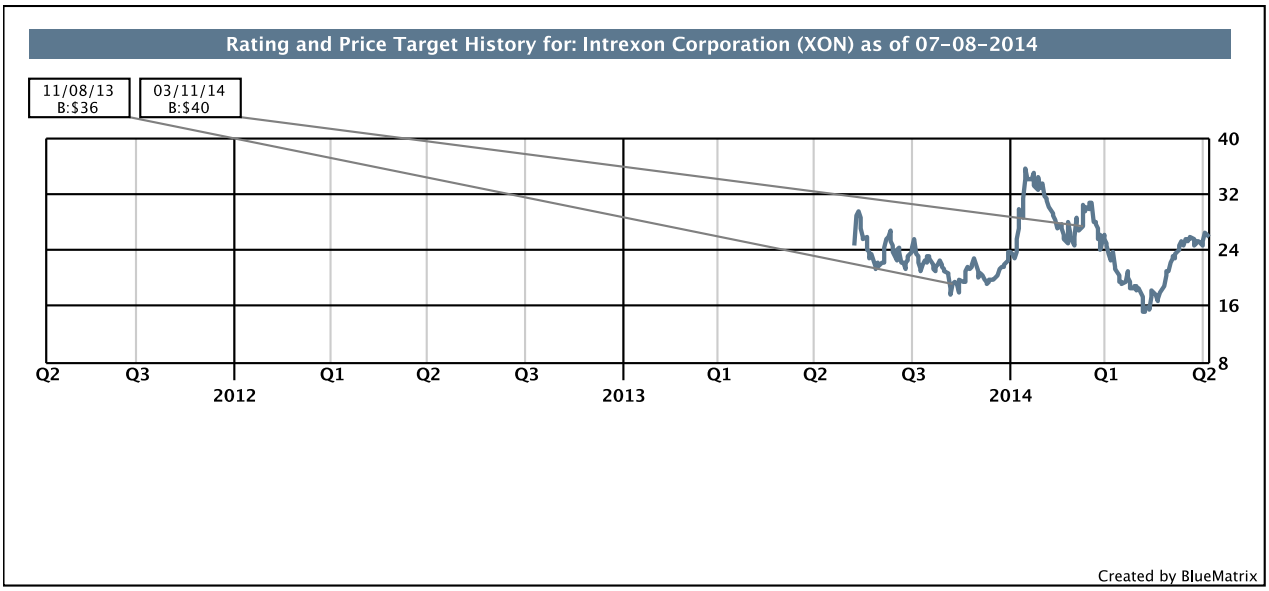

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