

Evolva

FY16 results

Agreement reached

EverSweet is due to be launched in 2018 following the recent, much-awaited collaboration agreement with Cargill. Evolva is due to participate in the JV at the 30% level, and will also benefit from a new state-of-the-art bioprocessing facility for its other products. Our fair value is CHF0.81 per share and we believe the current share price offers a good entry point.

Year end	Revenue (CHFm)	PBT* (CHFm)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/16	9.6	(35.9)	(7.8)	0.0	N/A	N/A
12/17e	15.3	(24.6)	(6.0)	0.0	N/A	N/A
12/18e	23.3	(21.0)	(5.0)	0.0	N/A	N/A
12/19e	59.0	(5.7)	(1.3)	0.0	N/A	N/A

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

Spotlight on stevia

Now that a commercial agreement has been reached, the retrofit of the existing Cargill facility in Blair, Nebraska, can go ahead. The relatively small retrofit should ensure that EverSweet retains its first-mover advantage ahead of DSM's launch of a fermentation-based stevia sweetener in late 2018. While the risk of no agreement being reached between Cargill and Evolva has now disappeared, execution risks remain in terms of the retrofit and the new facility, both in financial (cost overruns) and operational terms (ramp-up may take longer than expected).

Transformation complete?

Over the past few years, Evolva has transformed itself from an R&D and technology platform with a number of products with potential, to a more traditional ingredients company with a number of commercialised products. The agreement with Cargill and the decision to build its own bioprocessing facility takes the transformation one step further, as Evolva will no longer rely on contract manufacturers for production, but will manufacture its own products, like most ingredients companies. In the longer term, this should result in lower costs and a greater ability to guarantee product quality, among other things.

Valuation: Fair value of CHF0.81 per share

Our new fair value is CHF0.81/share (previously CHF0.87). We have updated our model to reflect the investment in the new bioprocessing facilities and also the JV participation at the 30% level for EverSweet vs our previous expectation of 45%. We continue to value Evolva on a DCF basis with a 25-year model and a fade beyond year 15. The recent Standby Equity Distribution Agreement (SEDA) has increased the company's financial flexibility, although management has indicated that it will be looking to secure an additional CHF30m of project financing in 2017. We continue to believe that Evolva may eventually need to raise more cash and re-evaluate its balance sheet, most likely during FY18.

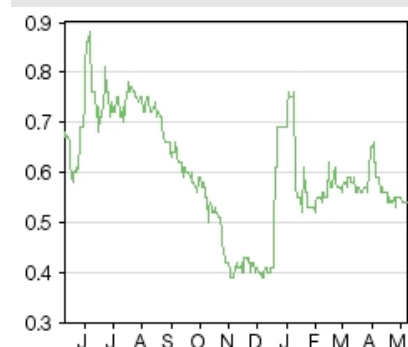
Food & beverages

9 May 2017

Price CHF0.54
Market cap CHF215m

Net cash (CHFm) at 31 December 2016	47.5
Shares in issue	397.9m
Free float	76%
Code	EVE
Primary exchange	SIX Swiss Ex
Secondary exchange	OTC US

Share price performance



%	1m	3m	12m
Abs	(8.5)	(3.6)	(18.2)
Rel (local)	(12.5)	(10.6)	(30.0)
52-week high/low	CHF0.9	CHF0.4	

Business description

Evolva is a Swiss high-tech fermentation company. It has a proprietary yeast technology platform, which it uses to create and manufacture high-value speciality molecules for nutritional and consumer products.

Next events

AGM	16 May 2017
H1 17 results	14 August 2017

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Investment summary

Company description: A high-tech fermentation company

Evolve is a Swiss high-tech fermentation company that is using its proprietary platform to create new production methods for nutritional and consumer health products. The potential of the technology has already been validated by the launch of its vanillin by International Flavors & Fragrances (IFF) and partnerships with companies such as Cargill, L'Oréal and Takasago. In April 2017, it formed a JV with Cargill to produce and commercialise EverSweet, a stevia sweetener obtained by fermentation. Launch is expected during 2018. Evolve was founded in 2004 and was listed on the SIX Swiss Exchange via a reverse acquisition of Arpida in 2009. It employs 177 people across seven sites: Basel (headquarters); Cambridge, UK; Chennai, India; Copenhagen, Denmark; two in California and one in Kentucky, US. Its main products are summarised in Exhibit 1 (page 3) and it has six active alliances.

Valuation: DCF valuation of CHF0.81/share

We value Evolve on a 25-year DCF basis. Our fair value is CHF0.81, or c 50% upside. We assume all product cash flows stop after 25 years, and start to fade beyond 15 years. We assume a WACC of 12.5%, given that we deem Evolve higher than average risk vis-à-vis the consumer goods space.

The next major catalyst is expected to be Evolve's launch of its stevia sweetener, EverSweet, during 2018, and the Nootkatone approval in insect control. Following the announcement regarding the agreement with Cargill, we expect Evolve will be securing an additional c CHF30m of financing during FY17 to meet future needs.

Sensitivities

Evolve's prospects are most tied to the success of its stevia sweetener EverSweet, although it is not fully dependent on it. EverSweet's true potential will only become fully clear after launch, when the taste range and production costs are better known. In addition, its ability to replace sugar or high fructose corn syrup (HFCS) in food and beverages will only become clear once the major food and beverage manufacturers have reformulated their products and have launched them on the market.

Four of Evolve's products have recently been launched. There is therefore uncertainty about product revenues in the coming years, which will also affect the company's working capital. With all Evolve's products, the addressable market is still relatively small, and part of the investment case rests on the cheaper and more reliable substitute leading to an expansion in market size. There are uncertainties around this too, which affect visibility on product revenues in future years.

Evolve had net cash of CHF48m at end December 2016, and we forecast a cash position of CHF43m at end FY17 (including CHF10m from securing debt financing), but further rounds of capital-raising are a potential risk.

Financials

We have updated our forecasts to reflect recent news of the EverSweet collaboration agreement with Cargill. We have reduced the Evolve participation to 30% as per the agreement from our previous assumption of a 45% JV participation level. We have also adjusted our capex and funding assumptions to incorporate the new company guidance regarding the planned retrofit and build of the bioprocessing facilities in Blair, Nebraska.

Company description: A fermentation company

Evolva combines modern genetics with fermentation technology to provide a wide range of natural ingredients. It uses yeast to make the ingredients more reliably and sustainably, and usually with a much higher yield than can be obtained from other processes, hence the Evolva ingredient can also be cheaper than the alternative. Evolva's ingredients are typically used in food, drink, cosmetics and personal care, consumer health, household products, pharmaceuticals and agriculture. For some ingredients Evolva finances all the work itself, whereas for others it has collaborated with partners. Some products have also been acquired. Evolva's main products are shown in Exhibit 1.

Exhibit 1: Selected product pipeline

Product	Development stage	Product type
Resveratrol	On market	Dietary supplement
Vanillin	On market	Food flavouring
Nootkatone	On market	Fragrance/insect repellent*
Valencene	On market	Fragrance
Stevia	Scale-up	High-intensity natural sweetener
Saffron	Scale-up	Food ingredient

Source: Edison Investment Research, Company data *NB: not yet on market for insect control

The product with the largest addressable market is Evolva's stevia sweetener. There may be other larger products in the pipeline, but they are early stage and as yet unknown to us. Stevia is a natural, zero-calorie, high-intensity sweetener. It is traditionally obtained from the stevia plant. The stevia plant produces many different steviol glycosides (stevia derivatives), but only RebA is currently used as a sweetener as it is the only one with an acceptable taste and a high enough concentration in the leaf. Its main drawback is the lingering bitter, liquorice aftertaste. The stevia plant also makes RebD and RebM, which do not have these taste drawbacks, but are in very low concentration in the stevia leaf, thus making extraction by traditional methods uneconomical. However, Evolva can make both RebD and RebM on a large scale using yeast fermentation.

Evolva has partnered its stevia sweetener, EverSweet, with Cargill, a leading player in the sweetener industry globally. In April 2017 Evolva signed a collaboration agreement with Cargill for the commercialisation and marketing phase of stevia. An existing Cargill manufacturing facility in Blair, Nebraska will be converted to produce stevia (and other Evolva products) and we expect launch during 2018, with manufacturing scaled up over the next two to three years. In addition, a bioprocessing facility will be built and operated by Evolva on adjacent land leased from Cargill. This facility is expected to come on stream in 2019 and will be used to manufacture Evolva products such as resveratrol and nootkatone.

Evolva has other products already on the market at present, as detailed in Exhibit 1. These currently have a relatively modest addressable market, but in every case the market could grow significantly once an affordable alternative is available, with a reliable and sustainable supply chain, and this is what Evolva is aiming to achieve.

A diverse portfolio

Evolva's full range of products is illustrated in Exhibit 2. Evolva has transformed itself from an R&D and technology platform with a number of products with potential, to a more traditional ingredients company with a number of commercialised products. Vanillin and nootkatone have already been launched, resveratrol sales are developing (albeit from a low base) and we expect stevia to be launched in 2018. In addition, over time the product focus has shifted from legacy pharma products towards consumer health and nutrition.

Exhibit 2: Evolva product suite

Nutrition	Personal Care	Flavours & Fragrances	Agriculture	Legacy products
<ul style="list-style-type: none"> • Resveratrol • Stevia • Saffron • Roquette x2 	<ul style="list-style-type: none"> • Resveratrol • Nootkatone • Saffron • Roquette x2 • Ajinomoto • L'Oreal 	<ul style="list-style-type: none"> • Vanillin • Valencene • Nootkatone • Sandalwood • Agarwood • Takasago 	<ul style="list-style-type: none"> • Ergot • Valent 	<ul style="list-style-type: none"> • EV-035 • EV-077 • Pomecins

Source: Edison Investment Research, Evolva

Stevia

Stevia sweeteners are natural, zero-calorie, high-intensity sweeteners (HIS), which are typically 200-300x sweeter than sugar. They are traditionally obtained from the stevia plant and are currently the fastest growing segment in the sweetener market as they offer the twin benefits of being natural and zero-calorie. The stevia plant produces many different steviol glycosides, but only rebaudioside A (RebA) is currently used as a sweetener as it is the only one found at high enough levels in the stevia leaf with an acceptable taste. However, the main drawback is the lingering, bitter liquorice flavour, which intensifies as the concentration of RebA is increased and can only be solved by adding bitter taste-masking agents, or sugar/HFCS. Furthermore, stevia's sweetness has a natural peak that cannot be improved by increasing concentration. The result so far has been that stevia sweeteners are typically blended with sugar or other sweeteners, particularly in beverages, such that the final product has a 35-40% reduction in calories vs the regular equivalent.

The stevia plant also makes other steviol glycosides such as RebD and RebM, which do not have these taste drawbacks. The problem to date has been that the concentration of these alternative steviol glycosides in the plant is well below 1%, thus making extraction by traditional methods unfeasible from both a cost and practical perspective. However, Evolva can make both RebD and RebM on a large scale using yeast fermentation.

The use of stevia has been held back by the current production costs, as well as taste issues. The cost of producing RebA from plants is estimated to be greater than that of sugar and HFCS (c \$750/tonne on a white sugar-equivalent basis compared to c \$450/tonne for sugar in Europe, c \$700/tonne in the US, and \$500/tonne for HFCS). Moreover, most high-intensity sweeteners cost more than one-third less to produce: aspartame is one of the cheapest artificial sweeteners available at c \$50/tonne on a sugar-equivalent basis, while sucralose costs c \$100/tonne on the same basis. The cost of leaf-derived stevia will come down with the breeding of larger plants with higher levels of steviol glycosides (eg GLG Life Tech's Huinong 3 strain) and improvements in the extraction process. However, it is difficult to believe that these changes will allow the price of RebA to be halved, let alone production of other steviol glycosides at prices comparable to those of sugar or HFCS. Evolva management plans to launch EverSweet at an initial premium to sugar and HFCS, but over time the expectation is that it will be priced at a comparable level to sugar and HFCS.

Evolva, together with Cargill, which has commercial relations with all food manufacturers and beverage companies, is well placed to become the leading provider of stevia sweeteners, as their

production method should overcome the taste and cost issues that have held back their use. Other companies producing stevia sweeteners include PureCircle, GLG Life Tech and Stevia First, but all rely on the use of stevia plants with complex extraction processes and supply chains (see our June 2016 [update note](#)). A more challenging potential competitor is DSM, which is developing a fermentation-based stevia product, with launch currently scheduled in late 2018. We expect Evolva/Cargill to have a significant cost advantage over the plant-based competition, and we believe the first-mover advantage will be important in capturing market share vis-à-vis the fermentation-based competition. Evolva continues to believe the addressable sweetener market in beverages is worth an estimated \$4bn, and that it is likely to remain the principal subcategory for stevia consumption. Of course confectionery, dairy and baked goods are also likely to be areas where sugar can be substituted.

The Cargill/Evolva agreement

In 2013 Evolva exclusively partnered its stevia programme with US agri giant Cargill, with the latter being responsible for the manufacture and commercialisation of the resultant stevia sweeteners. In April 2017 it formed a JV with Cargill for the production and commercialisation of its stevia product, EverSweet. Under the terms of the commercial agreement, Evolva will receive up to 30% of the business. Evolva expects to ultimately receive the full 30%, but the exact amount is dependent on the strain efficiencies achieved, and there is yet some work to be done here to optimise efficiency. In order to retain first-mover advantage (most notably vs DSM, which is due to launch a fermentation-based stevia product towards the end of 2018), initial production will be at an existing Cargill fermentation facility in Blair, Nebraska. The facility will be operated by Cargill and also used for the fermentation of other Evolva products (such as resveratrol, valencene and nootkatone). In addition, under the terms of the agreement Evolva has the right to ask Cargill to support some of its cash flow commitments at a favourable interest rate and in exchange Evolva is foregoing future milestone payments on EverSweet. In parallel, Evolva will build and operate a new bioprocessing facility on adjacent land leased from Cargill, and this facility will come online in 2019 and manufacture Evolva products, such as resveratrol, nootkatone and valencene.

Over the next three years, Evolva expects to invest c \$60m in the facilities. The recent CHF30m equity commitment from Yorkville in the form of a SEDA will serve as a foundation (see our recent [update note](#) for full details), and management expects to secure additional project financing during 2017 to meet the remaining obligations of c CHF30m.

Evolva and Cargill are set to launch their stevia product at a time when demand for sweeteners is accelerating. The demand for natural sweeteners to replace man-made aspartame (the main high-intensity sweetener) and sucralose continues to increase, and consumers are increasingly demanding clean labels. We expect the use of RebD and RebM will result in a greater use of stevia and the potential development of beverages sweetened solely by stevia products.

We forecast that peak sales of \$600m, or 15% of the addressable \$4bn market, are achieved in FY24. The food and beverage manufacturers will have to reformulate their products once EverSweet is launched, which is likely to take some time. We note Cargill's CEO is on record estimating EverSweet's peak sales could be \$500m, and we believe Cargill is being conservative. We apply a 90% probability of success given the product is now at an advanced stage – but execution risks remain – and we assume peak operating margins of 30%. Although margins of 45-50% should be possible once production is fully optimised, we believe the presence of DSM as a direct competitor is likely to permanently erode margins to a lower level.

Resveratrol

Resveratrol is a natural plant ingredient most notably associated with its presence in red wine. It is purported to have many health benefits, including longevity and bone density. Evolva's resveratrol

is produced by yeast fermentation and is made from natural and sustainable feedstocks. It has status in the US and Novel Foods authorisation for use in dietary supplements in the EU. The market was estimated to be worth c \$50m in FY12 (source: Frost & Sullivan), mainly in nutritional supplements in North America. Evolva believes there is room for growth in nutritional supplements, but also that use will be extended to a number of other areas including bone health, blood glucose control, cognition and cardiovascular health. This would make the addressable market significantly larger. Resveratrol was launched in late 2014 but with very limited volumes (due to operational reasons) until early 2016. The initial launch was very promising and market feedback was positive. As of mid-2016 the production constraints were resolved and the company sees a strong potential for the product. We forecast peak sales of \$34m in FY21.

Nootkatone

Nootkatone is a citrus ingredient found in grapefruit that has been shown to act as a highly effective insect repellent. It is primarily produced by extraction from grapefruit oil or by the oxidation of valencene. We estimate the cost is \$2,000-3,000/kg and hence this limits its use to high-end fine fragrance. At Evolva's significantly lower price, it could be expanded to high-volume applications in personal care, hair care and laundry products, with a potential market size well over \$100m. In August 2015 Evolva launched nootkatone into flavour and fragrance applications.

The insect repellent market is dominated by products containing DEET, which is man-made, oily and has an unpleasant smell. Nootkatone has been shown to be effective against a range of insects including ticks (which cause c 30,000 cases pa of Lyme disease in the US, source: CDC), bed bugs and mosquitoes (carriers of malaria and West Nile virus). The US Centers for Disease Control (CDC) demonstrated that nootkatone is a highly effective agent against the ticks that transmit Lyme disease. Nootkatone has a pleasant citrus smell, is non-greasy, fast-drying and natural.

Evolva is not the only company to be marketing nootkatone produced in yeast, as Isobionics has also developed yeast strains that make the compound, and signed a distribution agreement with DSM in May 2014. At this stage it is not possible to know whether Evolva or Isobionics has a cost advantage.

Before initiating sales of insect control products containing nootkatone, it is necessary to obtain regulatory approval from the US Environmental Protection Agency (EPA) and similar bodies in other countries. In August 2015, Evolva received approval from the EPA to classify nootkatone as a biochemical pesticide active ingredient. This allows for a potentially expedited process for registration of nootkatone for use against pests. Evolva estimated that it would receive EPA approval in 2018 to get nootkatone approved as an insect and tick repellent in the US.

We estimate that Evolva's nootkatone sales will peak at \$150m in FY24. We also apply a 75% probability of success to the product.

Valencene

Valencene is a flavour and fragrance extracted from oranges and used in food and drink, personal care and household products. It is also an intermediate in the production of nootkatone. Traditional methods of production require extraction from orange peel and yields are extremely low. Fermentation provides a much cheaper and reliable supply. That said, the market price of valencene is only \$500-900/kg as the compound does not have nootkatone's insect repellent activity. DSM is distributing Isobionics' yeast-produced valencene. Evolva expects the market for its valencene to remain modest. We are cautious on the commercial potential of Evolva's valencene, estimating that it will only achieve peak sales of \$10m after seven years in FY21, although we apply 100% probability of success given that traditionally produced valencene already has an established market and Evolva is not expecting substantial market growth.

Vanillin

Vanillin is a complex blend of flavour and fragrance ingredients, the most important of which is vanillin. Evolva estimates the total vanillin and vanilla extract market is worth c \$650m, with volumes of 16,000 tonnes. Vanillin is mainly used as a flavouring agent, primarily in food and beverages, but also to mask unpleasant tastes in medicines and animal feed. Due to the high cost of natural vanilla (c \$1,500/kg, source: Evolva), 99% of all vanilla consumed worldwide is synthetic. It is either chemically synthesised from lignin (EU and US cost: \$400-800/kg) or hydrocarbons (cost: \$10-20/kg) or fermentation-derived (cost is similar to chemical synthesis from lignin). Evolva partnered Vanillin with IFF in 2011 and in 2014 the product was launched under the Always Vanilla brand name. This was the first product to be launched that was made using yeast wholly developed by Evolva, thus making it an important milestone.

Evolva estimates the total addressable market for its natural vanillin product could be worth c \$500m, although process improvements are required for most of this market to be addressable. IFF's current competitive advantage is that it can produce natural vanillin flavouring at a lower cost than competitors in this niche, and we therefore expect peak sales of \$35m. The manufacturing efficiencies mentioned above should help to reduce cost, and hence allow IFF's natural vanillin to compete more effectively against synthetic vanillin by encouraging more switching. The flavour could become customisable as Evolva is developing manufacturing processes for the other vanilla-flavour compounds, although we do not expect Evolva's vanillin products to replace those from the orchid. We apply a 100% probability of success to the product given it has already been on the market for several years.

Saffron

Saffron ranks as one of the most expensive spices: the crocus from which it is derived has low yields, the harvesting process is very labour-intensive and c 95% of supply comes from Iran (source: Evolva), thus making the supply chain complex and subject to fluctuation. Evolva can make all the key saffron ingredients by yeast fermentation, thus significantly lowering the cost and offering a much more stable supply chain. It believes these two benefits could significantly expand the market and estimates the total current addressable market for its saffron product could be c \$400m. We forecast peak sales of \$50m in FY24 and adjust for a 50% probability of success with the product.

Sandalwood

Sandalwood oil is traditionally used in perfumes, with santalols being the main compounds. The East-Indian sandalwood tree is endangered, so the industry has replaced it with synthetic substitutes and with Australian sandalwood oil. However, the latter is in short supply and does not have the same odour qualities. Evolva's fermentation-based santalols could be used as an alternative. We forecast peak sales of \$10m in FY23 and apply a 60% probability of success.

Agarwood

Agarwood and its distillates (oud) have been used historically in incenses and fragrances. The natural supply of agarwood is limited, hence Evolva's aim to produce agarwood ingredients by fermentation should reduce costs and expand use. The project is at an early stage.

Other

We believe there are several other undisclosed programmes under way, which are significant value drivers but are yet to be disclosed for commercial reasons.

Partnerships

Evolva is also collaborating with companies to develop ways of producing other compounds in yeast (Exhibit 3). Evolva has tended to use partnerships to make compounds that need to be

produced via a chemical pathway that it has not already used for other products. Although the financial return on these is less than Evolva is able to make on proprietary programmes, it gains valuable IP that facilitates the production of other compounds made via the same pathway for its proprietary pipeline.

As Evolva's capabilities become validated and it is in a stronger financial position, it can negotiate better terms and bear some financial risk (initial alliances included a fee-for-service element). In its more recent alliances with L'Oréal and Takasago, the development costs are shared, as will be the potential profits, in a similar structure to the stevia collaboration. Overall, Evolva should be able to make significantly better returns from the later partnerships.

Exhibit 3: Summary of partnerships

Partner	Product area	Notes
BASF	Crop protection	Beryl is a family of ergot alkaloid products made by certain fungi. Evolva is focused on the more promising of two programmes (one in crop protection, the other in pharmaceuticals). It is designing and optimising biosynthesis routes for a natural product with crop protection potential, with BASF responsible for subsequent development. Evolva was paid an upfront technology access fee and receives research fees, potentially milestones and royalties. In addition, Evolva may potentially earn revenues from other Beryl products. Initiated in March 2011.
Roquette	Food product & personal care ingredient	Evolva developed novel biosynthetic production routes for an important food ingredient. Evolva received an upfront technology access fee and will receive milestones totalling a single-digit CHFm amount and payments based on the value created by the project. Initiated in January 2012, in 2014 Roquette paid Evolva research fees and a milestone payment and Evolva's work completed in November 2015. Roquette has exclusivity for certain rights in the Ruby family, while Evolva retains rights to the rest. In future Evolva's revenues will come from commercialising these latter ingredients in the Ruby family.
Ajinomoto	Personal care ingredient	3.5-year collaboration to develop a novel fermentation production process for a natural functional ingredient for use in personal care. Evolva received an upfront exclusivity and technology access fee, and will receive monthly research fees and potentially milestones (all fees and milestones total >CHF10m) and royalties on sales. Evolva will also earn revenues from commercialising the family ingredients for which it retains rights. Initiated in January 2013, first phase successfully completed in March 2015.
L'Oréal	Ingredient for cosmetics	Co-developing biosynthetic production routes for an important ingredient for the cosmetics industry, in a three-year alliance. Evolva receives some research fees and potentially development milestones. Initiated in February 2014, first milestone achieved in January 2015, second milestone achieved in November 2015. Evolva's long-term revenues are expected to derive from the collaboration in cosmetics, but also from Evolva commercialising opal ingredients outside the cosmetics field.
Cargill	Stevia and undisclosed food ingredient family	Following the successful collaboration in stevia, in January 2015 a second collaboration was initiated covering an undisclosed high-value food and beverage ingredient family. This is still in the early stages and Evolva and Cargill will share costs.
Takasago	Flavour/fragrance ingredients	Evolva will co-develop novel biosynthetic production methods for several undisclosed ingredients for the flavours and fragrances markets. Evolva will be primarily responsible for the R&D, scale-up and manufacturing, and Takasago for regulatory approvals and commercialisation; all costs will be shared equally, as will the economic value derived from the manufacturing and commercialisation of the products. Initiated in 2015.
Valent	Agriculture	Bioactives are used in both organic and conventional agriculture and help farmers improve crop yields without negative effects on human health or the environment. Evolva and Valent BioSciences (a subsidiary of Sumitomo) are co-developing and commercialising a class of high-value active ingredients for use in agricultural bioactives. Initiated in March 2015, launch is expected in 2019-2020. Total spend on the project is expected to cost CHF12-14m over the next five years, which Evolva and Valent will split.

Source: Edison Investment Research, Evolva. Note: The Roquette collaboration was completed in November 2015.

Legacy products

Before 2010, Evolva's business model focused on the discovery and development of novel pharmaceuticals. Following its refocus, Evolva has out-licensed or sold its three legacy products (EV-077, EV-035 and Pomecins).

In 2013 Evolva out-licensed EV-077 to Serodus. The product is in Phase II and is targeted at diabetic nephropathy and other diabetic complications. Evolva is entitled to clinical and regulatory milestones, and royalties on sales. In December 2014 Evolva sold the EV-035 series to Emergent BioSolutions. The product is a preclinical antibiotic series. Evolva has received two payments from Emergent so far and is also potentially due clinical and regulatory milestone payments up to \$65m. In addition, it could be due tiered royalties.

Pomecins are antifungal ingredients with potential uses in crop protection, personal care and food preservation. The method of production is synthetic rather than by fermentation, hence they are

classed as legacy products. Evolva has granted an option to license Pomecins to PI Industries. No significant revenues are expected in the near term.

Evolva uses research collaboration grants (Exhibit 4) as a source of non-dilutive funding to enhance its technology platform and develop its pipeline. In the current collaborations, Evolva uses its expertise in modifying yeast to create new ways of producing compounds with health benefits.

Exhibit 4: Research collaborations

Collaboration	Total grant (funding body)	Start date	End date	Notes
DIABAT	€10.0m (European Commission)	Oct 2011	Sept 2015	An FP7 project to study the recruitment and activation of brown adipocytes to develop innovative therapeutic and preventative strategies for type 2 diabetes. There are 19 participants in the collaboration. Details of Evolva's funding and role in the project are not disclosed.
Bachberry	€9.5m (European Commission)	Nov 2013	Oct 2016	An FP7 project to develop ways of exploiting the potential of phenolic compounds found in berry species, including the ability to manufacture them in scalable fermentation bioprocesses. There are 17 participants in the collaboration.
Chem 21	€26.4m (European Commission)	Oct 2012	2017	An Innovative Medicines Initiative (IMI) programme to develop a range of methods to make the drug development process more environmentally friendly mainly focused on catalytic technologies. There are 21 participants, including six pharma companies.
YEASTCELL	€3.1m (European Commission)	Sept 2013	Aug 2017	An FP7 project to deliver an innovative programme to train early-stage researchers so that they have productive careers in yeast biotechnology. There are 13 participants from eight EU countries. Details of Evolva's funding and role in the project are not disclosed.
PROMYS	€9.4m (European Commission)	Dec 2013	Nov 2017	An FP7 project to develop, validate and implement a novel synthetic biology platform technology called ligand-responsive regulation and selection systems. Evolva's role is to develop a yeast that produces at high yields a taste-modulating ingredient, which has commercial potential.
Plant Power	DKK20.7m [€3.5m] (Danish Council for Strategic Research)	2013	2018	A project to develop carbon-neutral production platforms for complex terpenoids, which could be used in photo-bioreactors. There are 12 participants.
Tet4Biotech	DKK6m [€0.8m] (Innovation Fund Denmark)	2015	2018	A project to enable ingredients to be secreted from yeast, thus improving production. It uses transporter technology and part of the project includes the development and screening of a transporter library.
CHASSY	N/A	2016	2020	The aim is to deliver a group of yeast strains that can be used in the production of high-value oleochemicals and aromatic molecules. These can serve as a versatile chassis in the biotech industry.

Source: Evolva, Edison Investment Research. Note: FP7 = European Commission Seventh Framework Programme.

Technology platform and production

All of Evolva's programmes have been developed using its yeast fermentation platform (Exhibit 5). Its technology involves combining genes from different organisms in yeast to produce the compounds of interest in a natural and cost-effective process. The products are not considered genetically modified organisms (GMOs) because the end-compounds are pumped by the yeast cells into the media, and include no DNA.

Once the yeasts producing the product of interest have been generated, programmes move into the scale-up phase: the fermentation process is scaled up to bench production (<10 litre fermentation content), to pilot scale (<10,000l fermentation content) and eventually commercial production (>10,000l). The scaling-up phase can take up to two years to complete, depending on the challenges that are encountered (eg optimising yields, reducing frothing), but there is limited risk associated with this stage.

Exhibit 5: Background information on biosynthesis

What is biosynthesis?	Biosynthesis is the use of nature to develop new compounds or methods of producing certain compounds.
How is it performed?	The compounds are produced by assembling genes from different organisms in yeast artificial chromosomes (YACs), so that the yeast strain makes the specific product. Evolva's core technology involves randomly combining hundreds of genes from different organisms to form millions/billions of unique YACs. Detection systems are used to identify those cells that are producing potential therapeutic compounds or the chemical of interest. Those cells are then optimised to improve the production yields before the production process is scaled up. Allylix used a rational approach to combine specific enzymes to produce the desired compound.
What are the advantages of biosynthesis?	Biosynthesis is a time- and cost-effective method of identifying novel products and pathways. Standard methods are laborious and limited either by the breadth of a library of molecules and/or the experience of chemists.
What are the disadvantages?	For nutritional and consumer goods, there are no obvious disadvantages, although it might be cheaper in many cases to produce compounds using synthetic methods.
What value is it to the food ingredient industry?	The food ingredient industry is always looking at ways of reducing the costs of production, improving a product's characteristics (eg current stevia sweeteners are rebaudioside A, whereas other rebaudiosides or combinations thereof might have a better taste) and providing more stable supply chains (eg >90% of saffron is produced in Iran). There is a particular demand for naturally produced ingredients because of consumer demand.
Is the technology IP protected?	The core technology is patent-protected until at least 2022. Additional IP protection is afforded by the trade secrets associated with specific laboratory protocols.

Source: Edison Investment Research

Sensitivities

Evolva's prospects are most tied to the success of its stevia sweetener EverSweet, although it is not fully dependent on it. EverSweet's true potential will only become fully clear after launch, when the taste range and production costs are better known. In addition, its ability to replace sugar or HFCS in food and beverages will only become clear once the major food and beverage manufacturers have reformulated their products and launched them on the market.

Four of Evolva's products have recently been launched (see Exhibit 1). There is therefore uncertainty about product revenues in the coming years, which will also affect the company's working capital. The potential of Evolva's products depends on the competitive characteristics (including price) of its new production processes. Thereafter it also depends on improving manufacturing efficiency and introducing line extensions, and competition from other biosynthesis companies. With the recent news that Evolva will build its own bioprocessing facility comes the added risk that there may be problems or delays in commissioning the new facility.

With all Evolva's products, the addressable market is still relatively small or emerging, and part of the investment case rests on the cheaper and more reliable substitute leading to an expansion in market size. There are uncertainties around this too, which affect product revenues in future years.

There is limited market information for most of Evolva's products, thus it is difficult to estimate the rate at which the product sales will grow, and their potential peak sales. This not only causes challenges for us in valuing Evolva, but also operational and working capital issues for the company as it needs to commission the various products.

Evolva had net cash of CHF48m at December 2016, and we forecast a cash position of CHF43m at end FY17 (including CHF10m from securing debt financing). Management has stated that it expects to secure additional project financing of c CHF30m by the end of 2017, which we have assumed is in the form of debt in our model (drawn down over three years), but further rounds of capital-raising are a potential risk.

Valuation

We update our DCF valuation to reflect recent newsflow, including the additional project financing of CHF30m that management expects to secure (see detail on page 11), and the JV participation rate of 30% for stevia (vs our previous assumption of 45%). We detail our valuation in Exhibit 6 and our updated fair value is CHF0.81/share (from CHF0.87). We use a 25-year DCF with a fade. We

slightly reduce the R&D and capex in year 6 to reflect our assumption that there will be no new products in the pipeline. In year 11 we reduce these much further as we assume the company will be running on the existing products, and cash flows will then cease. The different products have varying peak sales and ramp-up assumptions as detailed for each above. In 2031 (year 14) we start to fade stevia and vanillin, which are the two biggest products, and from 2035 we start to fade the other products. We assume the stevia and vanillin patents are the first to expire. Stevia remains the key product, at c 45% of our valuation (after adjusting for tax and capex).

We note that we use our estimate for the number of shares in FY17 for the purpose of our DCF valuation. We forecast an increase in shares through to FY19 as the SEDA is exercised. As discussed in our March 2017 [note](#), the SEDA is fully flexible and hence will be exercised as necessary, rather than according to a pre-agreed schedule. At the current share price, the total commitment would represent dilution of c 10%. In addition, as discussed below, we assume that the additional CHF30m of financing that Evolva will look to secure in FY17 is debt-based.

Exhibit 6: Summary of DCF valuation

Product	Value (CHFm)	Value per share (CHF)	Notes
Stevia	202.0	0.50	Launch date: 2018; peak sales: \$600m; likelihood of success 90%; operating margin: 30%; profit share: 30%.
Saffron	12.7	0.03	Launch date: 2018; peak sales: \$50m; likelihood of success 60%; royalty: 10%.
Resveratrol	91.5	0.23	Launched; peak sales: \$200m; likelihood of success 100%; margin: 40%.
Vanillin	14.7	0.04	Launched; peak sales: \$35m; likelihood of success 100%; royalty: 5%.
Nootkatone	119.9	0.29	Launched; peak sales: \$150m; likelihood of success 75%; * margin: 40%.
Valencene	29.1	0.07	Launched; peak sales: \$10m; likelihood of success 100%; margin: 40%.
Santalol	13.8	0.03	Launch date: 2018; peak sales: \$10m; likelihood of success 60%; margin: 40%.
Legacy products	32.8	0.08	EV-077 for diabetic nephropathy, EV-035 antibiotic indications
L'Oréal/Takasago/Cargill revenues	105.5	0.26	Launch date: 2020-22; number of products: 5; peak sales: \$150m per product; likelihood of success: 50%; royalty: 8%.
Other alliance royalties	36.4	0.09	Royalties from alliances with Ajinomoto, BASF and Roquette; launch date: 2016-18; number of products: 3; peak sales: \$150m per product; likelihood of success: 60%; royalty: 2%.
Other revenues	4.8	0.01	Only includes revenues from existing collaborations and grants.
R&D and admin	(220.7)	(0.54)	
Tax	(102.2)	(0.25)	
Capex	(58.6)	(0.14)	Includes investment of \$60m for commercialisation of stevia with Cargill and new bioprocessing facility.
Net cash	47.5	0.12	Net cash at FY16
Total	329.3	0.81	Using FY17e number of shares throughout. There could be dilution as the SEDA is exercised.

Source: Edison Investment Research. Note: WACC=12.5%. *There is no developmental risk associated with nootkatone, but we have applied a risk adjustment due to uncertainty about the use of the product as an insect repellent.

The next major catalysts are expected to be Evolva's launch of its stevia sweetener, and EPA approval of nootkatone as an insect repellent, during 2018. Other catalysts in 2017 could be potential new corporate collaborations and the successful securing of c CHF30m of project financing relating to the new bioprocessing facility in Nebraska.

Financials

We have updated our forecasts to reflect recent news of the collaboration agreement with stevia. We have reduced the stevia participation to 30% as per the agreement from our previous assumption of a 45% JV participation level. We have also adjusted our capex and funding assumptions to incorporate the new company guidance. Note that we still apply a 90% probability to stevia cash flows despite the collaboration being agreed. While we believe there is now certainty that the collaboration will go ahead, we view it as prudent to apply a risk factor for the possibility of delays and/or problems in the commissioning process.

Management has indicated that it expects to secure additional project financing of c CHF30m by the end of 2017. We have assumed this is in the form of debt in our model, and that it is drawn

down equally over three years (2017, 2018 and 2019). Our model also reflects the SEDA announced in March. For details, see our [note](#) published on 16 March 2017.

Exhibit 7: Financial summary

	CHF'000s	2015	2016	2017e	2018e	2019e
Year end 31 December		IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS						
Revenue		13,364	9,571	15,272	23,266	58,960
Cost of Sales		0	(2,951)	(3,398)	(7,400)	(25,331)
Gross Profit		13,364	6,620	11,874	15,866	33,629
EBITDA		(30,305)	(33,969)	(23,465)	(20,387)	(5,275)
Operating Profit (before GW and except.)		(31,947)	(36,083)	(24,519)	(21,431)	(24,519)
Intangible Amortisation		(3,779)	(5,090)	(5,090)	(5,090)	(5,090)
Exceptionals		0	0	0	0	0
Operating Profit		(35,726)	(41,173)	(29,609)	(26,521)	(11,406)
Net Interest		(129)	497	(60)	(7)	(3,011)
Other financial income		0	(338)	0	452	3,617
Profit Before Tax (norm)		(32,076)	(35,923)	(24,579)	(20,985)	(5,709)
Profit Before Tax (FRS 3)		(35,855)	(41,014)	(29,669)	(26,076)	(10,799)
Tax		4,067	5,160	0	0	0
Profit After Tax (norm)		(28,113)	(30,885)	(24,579)	(20,985)	(5,709)
Profit After Tax (FRS 3)		(31,788)	(35,854)	(29,669)	(26,076)	(10,799)
Average Number of Shares Outstanding (m)		353.0	397.9	406.5	423.7	441.0
EPS - normalised (c)		(8.0)	(7.8)	(6.0)	(5.0)	(1.3)
EPS - FRS 3 (c)		(9.0)	(9.0)	(7.3)	(6.2)	(2.4)
Dividend per share (c)		0.0	0.0	0.0	0.0	0.0
Gross Margin (%)		N/A	N/A	N/A	N/A	N/A
EBITDA Margin (%)		N/A	N/A	N/A	N/A	N/A
Operating Margin (before GW and except.) (%)		N/A	N/A	N/A	N/A	N/A
BALANCE SHEET						
Fixed Assets		143,457	141,356	141,201	166,092	186,027
Intangible Assets		131,940	130,256	125,165	120,075	114,985
Tangible Assets		8,431	7,522	7,454	7,435	7,460
Other fixed assets		3,086	3,578	8,582	38,582	63,582
Current Assets		88,780	56,880	49,148	20,053	17,475
Stocks		2,217	5,687	1,862	2,433	6,246
Debtors		2,785	2,139	2,510	3,825	9,692
Cash		83,228	47,517	43,239	12,259	0
Other current assets		550	1,537	1,537	1,537	1,537
Current Liabilities		(7,385)	(5,690)	(5,601)	(5,601)	(11,886)
Creditors		(1,182)	(1,174)	(1,086)	(1,086)	(1,162)
Short term borrowings		0	0	0	0	(6,208)
Finance lease obligations		(969)	(978)	(978)	(978)	(978)
Other current liabilities		(5,234)	(3,537)	(3,537)	(3,537)	(3,537)
Long Term Liabilities		(21,437)	(19,489)	(28,511)	(37,532)	(46,554)
Long term borrowings		0	0	(10,000)	(20,000)	(30,000)
Finance lease obligations		(4,134)	(3,564)	(2,586)	(1,607)	(629)
Other long term liabilities		(17,303)	(15,925)	(15,925)	(15,925)	(15,925)
Net Assets		203,416	173,057	156,238	143,012	145,062
CASH FLOW						
Operating Cash Flow		(31,353)	(33,555)	(17,251)	(18,970)	(8,412)
Net Interest		(376)	(301)	(60)	(7)	(3,011)
Tax		0	0	0	0	0
Capex		(1,865)	(947)	(985)	(1,025)	(1,066)
Acquisitions/disposals		3,278	(210)	0	0	0
Financing		59,956	0	10,000	10,000	10,000
Dividends		0	0	0	0	0
Other cash flow		(3,975)	(677)	(5,978)	(30,978)	(25,978)
Net Cash Flow		25,666	(35,690)	(14,274)	(40,980)	(28,467)
Opening net debt/(cash)		(57,191)	(83,188)	(47,448)	(33,174)	7,806
HP finance leases initiated		0	0	0	0	0
Other		331	(50)	(0)	0	0
Closing net debt/(cash)		(83,188)	(47,448)	(33,174)	7,806	36,273

Source: Edison Investment Research, Evolva

Contact details		Revenue by geography	
Duggingerstrasse 23 CH-4153 Reinach Switzerland +41 61 4852000 www.evolva.com		N/A	
Management team			
CEO: Neil Goldsmith		Chairman: Sir Tom McKillop	
Co-founder and CEO of Evolva since April 2004. He has worked in the industry for 28 years and was the co-founder of Topotarget and Personal Chemistry (now called Biotage). He was also CEO of Auda Pharmaceuticals, GX Biosystems and PNA Diagnostics.		Chairman since May 2012. He was CEO of AstraZeneca from 1999 until 2005 and previously CEO of Zeneca Pharmaceuticals from 1994 until the merger with Astra. He was president of the Science Council in the UK and is currently on the boards of Almirall and Alere. Sir Tom McKillop is due to retire from the board of Evolva and will be replaced by Gerard Hoetmer, who is already on the board, had various management positions at Unilever and was formerly CEO of Corbion (formerly CSM). He is currently chairman of Devro.	
CFO: Oliver Walker		CSO: Dr Jorgen Hansen	
CFO since December 2016. He was previously CFO of several life sciences companies including Sivantos, Nobel Biocare, Sonova and Stratec. He has wide-ranging experience in international companies, both listed and privately held.		CSO since April 2013. He has worked at Evolva since 2005, during which time he has run the Danish research team and led development of the vanillin and stevia projects. He has worked at Carlsberg and Poalis, and has a PhD in yeast genetics.	
Principal shareholders			
Aviva		3.32%	
Pictet		3.11%	
BASF Venture Capital		2.61%	
Sunstone capital		2.61%	
Cargill		2.50%	
UBP		1.50%	
Invesco		1.46%	
UBS		1.42%	
Companies named in this report			
Ajinomoto (JP:2802), BASF (FRA:BAS), Cargill, Coca-Cola (NYSE: KO), DSM (NA:DSM), Emergent BioSolutions (NYSE:EBS), International Flavors & Fragrances (NYSE: IFF), L'Oréal (FP:OR), PepsiCo (NYSE:PEP), PureCircle (LON: PURE), Roquette, Stevia First (OTC:STVF), Takasago(JP:4914), Valent Biosciences (owned by Sumitomo Chemical Corp).			

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