

Evolva

Stevia update

Tastes good

Evolva's stevia sweetener is due to be launched in 2016, and we expect the agreement with Cargill for Evolva to exercise its option for 45% participation in the stevia JV to be finalised before the end of 2015. With these catalysts on the horizon and a well-capitalised business following the September rights issue, we believe the current share price offers a good entry point. Our fair value is CHF1.87 per share.

Year end	Revenue (CHFm)	PBT* (CHFm)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/14	10.7	(21.2)	(6.4)	0.0	N/A	N/A
12/15e	14.0	(30.0)	(8.0)	0.0	N/A	N/A
12/16e	14.7	(30.9)	(7.8)	0.0	N/A	N/A
12/17e	23.3	(26.4)	(6.6)	0.0	N/A	N/A

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

Transformation underway

Evolva is currently transforming 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 very low base) and stevia is still on track to be co-commercialised in 2016. In addition, the product focus has shifted from legacy pharma products towards consumer health and nutrition.

Improved stevia taste

The commercial success of stevia-sweetened products is limited so far, as RebA is bitter and has a liquorice aftertaste. RebD and RebM taste better than RebA (the only stevia sweetener currently on the market), but are only found at very low levels in the stevia leaf (<1%). The fermentation approach used by Cargill/Evolva should ultimately be able to produce RebD and RebM as easily as RebA and at a lower price than plant-derived stevia. Cargill has said that Evolva's stevia sweeteners have a "sugar-like taste, no aftertaste, no bitterness". This could potentially give the Cargill/Evolva JV a major competitive advantage.

Valuation: fair value of CHF1.87 per share

Our new fair value is CHF1.87 vis-à-vis our previous fair value of CHF1.89. We have reduced our forecasts to reflect a slower ramp-up in stevia uptake as reformulations will take some time. In addition, we have extended our DCF to 25 years (from 10 years) with a fade beyond year 15, which we believe represents a fairer way of valuing the company, rather than assuming all cash flows stop after year 10. The company remains well-capitalised with a gross cash position of CHF47.4m at end H115 (pre-rights issue). The capital-raising improved its funding position and places the company in good stead to invest in the Cargill JV to commercialise stevia and the rest of its portfolio.

Food & beverages

15 January 2016

Price CHF0.99
Market cap CHF394m

Net cash (CHFm) at 30 June 2015	47.4
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	(2.0)	(13.9)	(29.0)
Rel (local)	(1.2)	(11.1)	(21.4)
52-week high/low	CHF1.7	CHF1.0	

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 event

FY15 results	30 March 2016
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Investment summary

Company description: A high tech fermentation company

Evolva 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. It was founded in 2004 and was listed on the SIX Swiss Exchange via a reverse acquisition of Arpida in 2009. It employs c 155 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 CHF1.87/share

We value Evolva on a 25-year DCF basis. Our fair value is CHF1.87, or c95% 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 we deem Evolva higher than average risk vis-à-vis the consumer goods space.

The next major catalyst is expected to be Evolva's launch of its stevia sweetener during 2016. We also expect an announcement regarding its JV with Cargill for the commercialisation of stevia. In H115 Evolva indicated its intention to exercise its option to form a JV and hence financially participate in the business at the 45% level. This was expected to come through in H215, but we now believe this will occur early in 2016. We note there was no firm deadline at the end of 2015.

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 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 Evolva'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 Evolva'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 product revenues in future years.

Evolva is currently well-funded following the CHF57m capital-raising in September 2015, but further rounds of capital-raising are a potential risk.

Financials

We have updated our forecasts to reflect movements in FX, most notably the US dollar/Swiss franc rate. In addition, we have reduced our PBT forecast for FY16 as we expect the stevia ramp-up to be slower than we had previously assumed, as the food and beverage manufacturers take their time to reformulate and launch their products.

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

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 steviolosides (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. For further explanation of steviolosides, see pages 5-6.

Evolva has partnered its stevia sweetener with Cargill, a leading player in the sweetener industry globally. In May 2015 Evolva signalled its intention to exercise its option to form a JV and hence financially participate in the business at the 45% level. We expect the final agreement to come through in the next few weeks. An existing Cargill manufacturing facility will be converted to produce stevia and we expect the Evolva/Cargill sweetener to be launched during 2016, with manufacturing scaled up over the next two to three years.

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 very low base) and stevia is due to be launched in 2016. In addition, 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 • Ruby • Coral 	<ul style="list-style-type: none"> • Resveratrol • Nootkatone • Saffron • Ruby • Agate • Opal 	<ul style="list-style-type: none"> • Vanillin • Valencene • Nootkatone • Sandalwood • Agarwood • Tourmaline 	<ul style="list-style-type: none"> • Ergot • Vanadium 	<ul style="list-style-type: none"> • EV-035 • EV-077 • Pomecins

Source: Edison Investment Research, Evolva

Vanillin: 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 natural cost: \$400-800/kg) or hydrocarbons (cost: \$10-20/kg) or fermentation-derived (cost is similar to EU and US natural). Evolva partnered Vanillin with IFF in 2011 and in IFF 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 to 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 peak sales of \$100m. 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.

Resveratrol: 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 GRAS status in the US and Novel Foods authorisation for use in dietary supplements in the EU. So far, resveratrol is only generating modest sales, but the initial launch was very promising. The market was estimated to be worth c \$50m in FY12 (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 other areas such as animal health and medical nutrition. This would make the addressable market significantly larger.

Nootkatone: 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 \$2000-3000/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 insect 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 if Evolva or Isobionics has a cost advantage, but Isobionics/DSM might be blocked from the more lucrative insect repellent market, as Allylix filed a worldwide [patent](#) in August 2013, which could be awarded in 2016, covering the use of a product with >10% by weight of nootkatone as an insect repellent or pesticide.

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 estimates it will take two to three years to get nootkatone approved as an insect and tick repellent in the US.

We estimate that Evolva's nootkatone sales will increase gradually to \$6m in FY19 with revenues primarily from the flavour/fragrance market. Subsequently, we forecast the sales growth will accelerate as nootkatone becomes used as an insect repellent more, so that peak sales of \$100m are achieved in FY24. We also apply a 75% probability of success to the product.

Valencene: 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 and DSM is distributing Isobionics' yeast-produced valencene. Evolva expects the market for its valencene to remain modest. We are more cautious on the commercial potential of Evolva's valencene, estimating that it will only achieve peak sales of \$10m after seven years in FY21.

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 steviolosides, 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 cannot be solved with taste-masking agents. 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 30-35% reduction in calories vs the regular equivalent.

The stevia plant also makes other steviolosides such as RebD and RebM, which do not have these taste drawbacks. The problem to date has been that the concentration of these alternative steviolosides 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.

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 May 2015 Evolva signalled its intention to exercise its option to form a JV and hence financially participate in the business at the 45% level. We expect the final agreement to come through in the next few weeks. In May 2015 Evolva and Cargill also announced the decision to convert an existing Cargill manufacturing facility in Nebraska to produce stevia. Following Evolva's rights issue in September 2015, we expect c CHF30m to be Evolva's contribution towards retrofitting Cargill's existing manufacturing infrastructure alongside Cargill over the next two to three years, such that fermentation-based stevia can be launched in 2016.

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 a 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 steviosides (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 steviosides at prices comparable to those of sugar or HFCS. By contrast, we estimate that Evolva/Cargill will be able to produce stevia at a lower price than sugar (c \$350/tonne on a sugar-equivalent basis) using its yeast method.

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. We expect Evolva/Cargill to have a significant cost advantage over these other companies and be best placed for the beverage high-intensity sweetener market, worth an estimated \$4bn (source: Evolva).

Evolva and Cargill are set to launch their stevia products at a time when demand for sweeteners is accelerating rapidly. The demand for natural sweeteners to replace aspartame (the main high-intensity sweetener) and sucralose continues to increase. The sales volumes for diet drinks with aspartame and sucralose continue to slide (-7% in FY13, -7% in FY14, source: AC Nielsen and FoodNavigator) because of health concerns, and led to Coca-Cola launching Coca-Cola Life and stevia-flavoured Sprite in the US and Europe in H214 and Pepsi doing the same with Pepsi True (and Pepsi Next in some markets). These drinks have 30-40% less sugar than the sugar-sweetened products, with the use of stevia currently being limited by the bitter/licuorice aftertaste. We expect the use of other steviosides (especially 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 \$700m, or 17.5% of the addressable market, are achieved in FY23. We have slightly reduced our near-term forecasts as we believe the uptake and ramp-up of fermented stevia may be slower than we previously forecast. 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 the relatively low-risk, scale-up stage, and we assume peak margins of 45%, which are in line with Evolva's other products. We believe that thanks to the technology acquired via the Allylix acquisition, Evolva should be able to achieve margins in the 40-60% range in due course.

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 \$100m in FY22 and adjust for a 60% 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

doesn't have the same odour qualities. Evolva's fermentation-based santalols could be used instead. We forecast peak sales of \$50m in FY22 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. These programmes are inherently more risky and, although the financial return 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 most recent alliances with L'Oréal and Takasago, and the second one with Cargill, 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	Code name	Product area	Notes
BASF	Beryl	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	Ruby	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	Agate	Personal care ingredient	A novel fermentation production process for a natural functional ingredient for use in personal care is being developed in a 3.5-year collaboration. 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.
L'Oréal	Opal	Ingredient for cosmetics	Evolva and L'Oréal are 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 develop 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	Coral	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	Tourmaline	Flavour/fragrance ingredients	With Takasago, 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	Vanadium	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 2015, launch is expected after 4-5 years. 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 has recently completed (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. Research collaborations support growth of Evolva.

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; Evolva will receive €0.4m in funding.
Chem 21	€26.4m (European Commission)	Oct 2012	Sept 2016	An Innovative Medicine 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. There are six participants in the collaboration; Evolva will receive €0.7m in funding and will 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 and Evolva will receive DKK1.7m (€0.3m) in funding.
Tet4Biotech	DKK6m (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.

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 recovered from the media, not the yeast cells, 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 (<10L 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 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 toll manufacturers to make the various products.

Evolva is currently well-funded following the CHF57m capital-raising in September 2015, but further rounds of capital-raising are a potential risk.

Valuation

Our DCF valuation of Evolva is broadly unchanged from CHF1.89/share to CHF1.87/share, as detailed in Exhibit 6. The main changes to our valuation are that we have extended our DCF to 25 years from 15 years (to 2040), but we also introduce the concept of a fade. We believe this is a fairer representation of the company given that a number of its products are still in development, and hence are yet to be launched, reach a peak and then are most likely to decline once they are technically superseded or no longer patent-protected. 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 15) 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. We have also adjusted the exchange rate assumption from \$1.028/CHF to \$1.017/CHF to reflect recent changes. Stevia remains the key product, at c 45% of our valuation (after adjusting for tax and capex).

Exhibit 6: Summary of DCF valuation

Product	Value (CHFm)	Value per share (CHF)	Notes
Stevia	539.9	1.36	Launch date: 2016; peak sales: \$700m; likelihood of success 90%; margin: 45%; profit share: 45%.
Saffron	131.1	0.33	Launch date: 2016; peak sales: \$100m; likelihood of success 60%; margin (costs and marketing): 40%.
Resveratrol	92.1	0.23	Launched; peak sales: \$200m; likelihood of success 100%; margin: 40%.
Vanillin	34.3	0.09	Launched; peak sales: \$100m; likelihood of success 100%; royalty: 5%.
Nootkatone	58.0	0.15	Launched; peak sales: \$100m; likelihood of success 75%,* margin: 40%.
Valencene	25.9	0.07	Launched; peak sales: \$10m; likelihood of success 100%; margin: 40%.
Santalol	65.9	0.17	Launch date: 2017; peak sales: \$50m; likelihood of success 60%; margin: 40%.
Legacy products	32.3	0.08	EV-077 for diabetic nephropathy, EV-035 antibiotic indications.
L'Oréal/Takasago/Cargill revenues	115.2	0.29	Launch date: 2019-21; number of products: 5; peak sales: \$150m per product; likelihood of success: 50%; royalty: 8%.
Other alliance royalties	31.4	0.08	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	19.0	0.05	Only includes revenues from existing collaborations and grants.
R&D and admin	-275.4	-0.69	
Tax	-177.3	-0.45	
Capex	-26.8	-0.07	Includes investment of \$30m for commercialisation of stevia with Cargill.
Net cash	79.8	0.20	Estimated net cash at end FY15.
Total	745.4	1.87	

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 catalyst is expected to be Evolva's launch of its stevia sweetener during 2016. We also expect an announcement regarding its JV with Cargill for the commercialisation of stevia. In H115 Evolva indicated its intention to exercise its option to form a JV and hence financially participate in the business at the 45% level, and we expect this to come through in early 2016. Other catalysts in 2016 could be potential new corporate collaborations.

Financials

We have reduced our 2016 forecasts for EverSweet as we believe our original expectations were too optimistic in terms of the ramp-up. We now expect 50% of peak sales will be reached in 2019 and 90% in 2021. We previously assumed 60% of peak sales would be reached in 2018, and hence a faster initial ramp-up. We believe as a base case scenario, it is more prudent to assume a slower uptake as the food and beverage manufacturers need to work on reformulating their products before making a switch to EverSweet, and this could take some time. We believe the process is already ongoing, but we suspect the FMCG companies will want to do this in stages: first reformulating some products and seeing the consumer response once they are fully launched (obviously all products will be comprehensively tested with consumer panels before launch). Once the success of the first wave of products is confirmed, the food and beverage manufacturers will be willing to further embrace EverSweet by reformulating more products. Uptake is therefore likely to be relatively slow at first, in our view. Given our reduced sales and profit assumptions, our forecast net cash is also lower (for FY16 CHF36.0m against CHF50.1m).

Exhibit 7: Financial summary

	CHF'000s	2013	2014	2015e	2016e	2017e
Year end 31 December		IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS						
Revenue		8,706	10,744	14,035	14,719	23,339
Cost of Sales		0	0	(317)	(2,256)	(6,283)
Gross Profit		8,706	10,744	13,718	12,463	17,055
EBITDA		(14,311)	(19,405)	(27,015)	(29,984)	(26,782)
Operating Profit (before GW and except.)		(15,685)	(20,872)	(28,657)	(31,540)	(28,319)
Intangible Amortisation		(2,002)	(2,284)	(3,779)	(3,779)	(3,779)
Exceptionals		0	0	0	0	0
Operating Profit		(17,687)	(23,156)	(32,437)	(35,319)	(32,098)
Net Interest		(514)	(357)	(1,353)	(156)	(2,696)
Other financial income		165	57	0	774	4,646
Profit Before Tax (norm)		(16,034)	(21,172)	(30,010)	(30,921)	(26,369)
Profit Before Tax (FRS 3)		(18,036)	(23,456)	(33,789)	(34,701)	(30,148)
Tax		1,860	1,613	1,150	0	0
Profit After Tax (norm)		(13,730)	(19,069)	(28,928)	(30,921)	(26,369)
Profit After Tax (FRS 3)		(16,176)	(21,843)	(32,639)	(34,701)	(30,148)
Average Number of Shares Outstanding (m)		241.4	291.9	362.4	397.9	397.9
EPS - normalised (c)		(5.5)	(6.4)	(8.0)	(7.8)	(6.6)
EPS - FRS 3 (c)		(6.5)	(7.3)	(9.0)	(8.7)	(7.6)
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		74,989	149,742	145,149	156,237	162,401
Intangible Assets		63,342	136,111	125,969	122,190	118,411
Tangible Assets		9,319	10,484	11,114	10,981	10,924
Other fixed assets		2,328	3,147	8,066	23,066	33,066
Current Assets		30,282	62,870	88,827	62,603	29,256
Stocks		56	313	1,648	2,472	3,443
Debtors		352	1,510	3,076	3,226	3,836
Cash		29,285	60,713	83,221	56,023	21,094
Other current assets		589	334	882	882	882
Current Liabilities		(8,591)	(13,460)	(10,525)	(7,178)	(7,230)
Creditors		(859)	(2,408)	(1,355)	(1,409)	(1,466)
Short term borrowings		(3,652)	(3,522)	(3,392)	0	0
Finance lease obligations		(338)	(354)	(565)	(565)	(565)
Other current liabilities		(3,742)	(7,176)	(5,213)	(5,204)	(5,200)
Long Term Liabilities		(13,399)	(24,158)	(23,417)	(42,852)	(42,288)
Long term borrowings		0	0	0	(20,000)	(20,000)
Finance lease obligations		(3,454)	(3,904)	(4,355)	(3,791)	(3,226)
Other long term liabilities		(9,946)	(20,254)	(19,062)	(19,062)	(19,062)
Net Assets		83,281	174,994	200,034	168,810	142,139
CASH FLOW						
Operating Cash Flow		(12,116)	(19,437)	(29,945)	(26,662)	(20,187)
Net Interest		(408)	(361)	(304)	(156)	(2,696)
Tax		0	0	0	0	0
Capex		(796)	(1,201)	(1,369)	(1,424)	(1,481)
Acquisitions/disposals		0	418	0	0	0
Financing		37,246	56,776	59,605	0	0
Dividends		0	0	0	0	0
Other cash flow		(2,738)	(4,614)	(5,596)	(15,565)	(10,565)
Net Cash Flow		21,189	31,582	22,391	(43,806)	(34,928)
Opening net debt/(cash)		(5,365)	(25,633)	(57,191)	(79,829)	(36,023)
HP finance leases initiated		0	0	0	0	0
Other		(921)	(25)	248	0	0
Closing net debt/(cash)		(25,633)	(57,191)	(79,829)	(36,023)	(1,095)

Source: Company accounts, Edison Investment Research

Contact details	Revenue by geography
Duggingerstrasse 23 CH-4153 Reinach Switzerland +41 61 4852000 www.evolva.com	N/A

Management team	
CEO: Neil Goldsmith Co-founder and CEO of Evolva since April 2004. He has worked in the industry for 22 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: Sir Tom McKillop 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 is president of the Science Council in the UK and is on the boards of Almirall and UCB.
CFO: Jakob Dynnes Hansen CFO since September 2007. He has worked in the sector for more than 20 years. Before joining Evolva, he was CFO at Nuevolution and Zealand Pharma. Previously he was a vice president at Unibank in corporate finance and head of market research at Novo Nordisk.	CSO: Dr Jorgen Hansen 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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