

Evolva

Gaining dominance

Evolva has strengthened its position as a leader in the field of biosynthetic production by acquiring Allylix in an all-share deal. It adds two marketed products to its portfolio and important IP, which will enable Evolva to lower production costs for stevia and other products. We expect Evolva to enter into a JV with Cargill for the commercialisation of stevia sweeteners in the coming months, which will confirm that this key programme is on track for launch in 2016. We have raised our valuation from CHF1.73/share to CHF1.82/share.

Year end	Revenue (CHFm)	PBT* (CHFm)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/12	7.0	(18.7)	(7.8)	0.0	N/A	N/A
12/13	8.7	(16.2)	(5.8)	0.0	N/A	N/A
12/14e	10.1	(21.0)	(7.4)	0.0	N/A	N/A
12/15e	15.6	(25.3)	(7.7)	0.0	N/A	N/A

Note: *PBT and EPS are normalised, excluding intangible amortisation and exceptional items.

Allylix acquisition adds products and IP

The acquisition of Allylix adds two marketed products, valencene and nootkatone, more than three development programmes and 100 granted patents to Evolva's portfolio. The most valuable assets are nootkatone (a flavouring/fragrance from grapefruit), which has potential in the >\$1bn insect repellent market; and IP that should allow Evolva to improve the production yields for stevia sweeteners and other products, thereby lowering production costs.

Acquisition combined with CHF4m equity placement

Evolva acquired Allylix in December for 46m shares (\$60m at CHF1.30/share), increasing the total share count by 16%. Linked to the acquisition, Cargill made an equity investment of USD4m, which largely covers the extra operating costs in FY15 due to additional cost base of Allylix. In subsequent years, the acquisition should be earnings enhancing due to sales of nootkatone and valencene.

Formation of stevia JV with Cargill expected in H115

We expect Evolva to exercise its option to form a JV with Cargill for the commercialisation of stevia sweeteners in H115. This would indicate that the scaling-up process and commercial plans are all on track for the launch of the first stevia sweeteners (including Reb A, Reb D and Reb M) in 2016. The stevia programme remains Evolva's key asset, accounting for 47% of our valuation.

Valuation: DCF valuation of CHF1.82/share

We raise our valuation from CHF1.73/share to CHF1.82/share. The main reason for the increase is the acquisition of Allylix, but Evolva has also been successful in partnering the legacy asset EV-035 (an anti-bacterial compound) to Emergent Biosolutions in a \$70.5m deal and formed new alliances with Takasago and Cargill. Much of the increase was offset by the strong appreciation of the Swiss franc.

Acquisition of Allylix

Pharma & biotech

11 February 2015

Price **CHF1.46**

Market cap **CHF479m**

US\$/CHF=1.15

Net cash (CHFm) on 30 June 2014 57.4

Shares in issue 327.6

Free float 85%

Code EVE

Primary exchange SIX Swiss Ex

Secondary exchange OTC US

Share price performance



% 1m 3m 12m

Abs 0.0 20.7 2.1

Rel (local) 5.6 24.1 (1.4)

52-week high/low CHF1.57 CHF1.09

Business description

Evolva is a Swiss biosynthesis 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

Formation of stevia JV Q115

FY14 results 31 March 2015

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Investment summary

Company description: Biosynthesis company

Evolve is a Swiss biosynthesis 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'Oreal and Takasago. It was founded in 2004 and was listed on the SIX Swiss Exchange via a reverse acquisition of Arpida AG in 2009. It has raised a total of CHF163m (including CHF10m from the merger with Arpida) and employs c 145 people across seven sites: Basel (headquarters); Cambridge, UK; Chennai, India; Copenhagen, Denmark; and two in California and one in Kentucky, US. Its main products are summarised in Exhibit 1 and it has seven alliances. It also has two partnered, legacy pharmaceutical programmes.

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

Source: Edison Investment Research

Valuation: DCF valuation of CHF1.82/share

We have increased our valuation of Evolve from CHF1.73/share to CHF1.82/ share (CHF598m), largely because of the acquisition of Allylix for \$60m in an all-share transaction, which added two marketed products (nootkatone and valencene) to Evolve's portfolio and provided valuable IP that should lower the manufacturing costs for stevia. However, the increase is offset by the significant strengthening of the Swiss franc, after the unpegging of the currency from the euro.

The next major catalyst is expected to be Evolve's decision in H115 to form a JV with Cargill for the commercialisation of stevia, which would indicate that commercial yields have been achieved and that Cargill has established a business plan for the launch of the stevia sweeteners.

Sensitivities

Evolve's prospects are most tied to the success of its stevia sweeteners, although it is not fully dependent on these products. The risk associated with the programme has been reduced significantly by the partnering with Cargill, a major producer and trader of agricultural products and food ingredients. But the true potential will only become clear when the taste range and production costs of Evolve's sweeteners and their ability to replace sugar or high fructose corn syrup in beverages and possibly in foods are better known.

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.

Financials

We have amended our estimates to take into account the H114 results, acquisition of Allylix and partnering of EV-035 with Emergent Biosolutions, and the appreciation of Swiss franc. We are now forecasting that revenues will increase by 49% to CHF15.6m in FY15 and CHF21.4 in FY16.

Evolve had a gross cash position of CHF60.7m (estimated net cash of CHF57.2m) at FY14. This means that the company is in a position to enter the JV with Cargill to market stevia sweeteners. It will probably still need to raise additional funds (we estimate c CHF20m) before it then becomes cash generative in FY17, but this funding could come from non-dilutive sources.

Company description: Gaining dominance

Evolva is strengthening its position as a leader in the field of biosynthesis with the acquisition of Allylix for 46m shares in total. It is gaining two launched products and valuable IP that should allow it to improve the production yields of various products, including stevia. Evolva now has four marketed products, and we expect that the company will exercise its option to form a JV with Cargill in the coming months to commercialise of stevia products. Stevia is on track to be launched in 2016 and is Evolva's main value driver. We have increased our valuation to CHF1.82/share.

Allylix acquisition adds products and important IP

Evolva had already established a strong position in biosynthesis, but inevitably it has focused its attention in certain areas. By acquiring Allylix, Evolva is not only acquiring two marketed products, but also a complementary IP portfolio and strengthening its position in the stevia market (Exhibit 2).

Exhibit 2: Summary of companies before and after the acquisition of Allylix by Evolva

	Evolva	Allylix	Merged entity
Products on the market	2 (vanillin, resveratrol)	2 (nootkatone, valencene)	4
Products in scale-up	1 (stevia)	N/A	1
Products in R&D	>7 (including saffron and agarwood)	>3 (including sandalwood)	>10
Patents	120 granted patents, 210 pending, 70 patent families	100 granted patents, 60 pending, 25 patent families	220 granted patents, 270 pending, 95 patent families
Partnerships	6 (Cargill, IFF, Ajinomoto, L'Oreal, Roquette, Takasago)	N/A	6
Number of employees	c 115	c 30	c 145
Shares in the merged company	277.6	50.0*	327.6

Source: Edison Investment Research. Note: Evolva also has two legacy pharmaceutical products in development. *Includes 3.1m shares issued to Cargill worth USD4m.

Allylix was formed in 2004 like Evolva, and both have since been developing ways of producing various flavours and fragrances in yeast (see page 8). Allylix created yeast capable of making specific compounds using a rational approach, while Evolva has primarily used a stochastic methodology of using genes from different organisms assembled. They have, however, developed expertise on different and complementary parts of the terpenoid pathway, so that the merged entity should be able to develop a broader range of flavours/fragrances with terpene structures. Evolva also has knowledge of various other pathways, including phenylpropanoid synthesis for the production of flavonoids.

Allylix has also developed important IP regarding the secretion of compounds by yeast cells into the surrounding media (liquid). This will be particularly valuable to Evolva's stevia programme, as the increased secretion of the stevia compounds will allow Evolva to increase yields and simplify the purification process, thereby lowering the manufacturing costs. Evolva estimates that these savings alone should account for over 75% of the cost of Allylix with conservative assumptions.

On top of the valuable IP, Evolva is gaining a portfolio of two marketed products, the most valuable being nootkatone, and over three products, which could be launched during the next three years. As all of the products are sold through the B-to-B channel, the marketing costs are limited and there are unlikely to be any specific sales synergies, especially as Allylix only has a few people in sales and marketing functions. However, the broader portfolio of products should enable Evolva to become recognised more quickly as a provider of yeast-produced specialty chemicals.

Evolva is acquiring Allylix for a total consideration of 46m shares (\$60m), 6m of which were held back and sold within a few days before Christmas 2014 to cover outstanding liabilities. The shares held by Allylix shareholders are subject to a staggered lock-up, being released in 12 tranches of c 3m over the course of the next 12 months.

Biosynthesis coming of age and the broader pipeline

Over the last 10 years, since both Evolva and Allylix were created, the biosynthesis of complex compounds in yeast has moved from the fringes of biotechnology into a field of proven commercial potential. This is shown by Evolva's four marketed products (Exhibit 3), following the acquisition, and its alliances with blue-chip companies such as BASF, which was also an investor in Allylix. The proven potential of synthetic biology has inevitably led to increasing competition from companies such as Amyris (listed on NASDAQ), Solazyme (listed on NASDAQ), Ginkgo BioWorks (private) and Isobionics (private company), but the market is still very fragmented and Evolva is a leader in the field in terms of size and IP. More details of Evolva's biosynthesis platform are explained in a section below.

Exhibit 3: Consumer health and nutritional products pipeline

Product	Notes
Resveratrol	Consumer product with wide range of claimed, potential health benefits (eg cardiovascular, ageing, cancer, osteoporosis, weight control) that is found in various plants, including red grape skins. A yeast strain producing resveratrol was acquired from Fluxome for an initial payment of CHF0.25m and 1.077m shares, CHF0.8m in cash in 2013, and single-digit royalty payments on sales up to c CHF65m cumulatively. Evolva re-launched the product in H214 after engineering the production strains to increase yields and lower manufacturing costs.
Vanilla	Part of the FOSU collaboration with five research groups to create vanillin and other compounds present in plant-derived vanilla flavouring by fermentation. Initiative was supported by the Danish Council for Strategic Research, but Evolva owns the main commercialisation rights to the process. The vanillin programme was partnered with IFF in January 2011; IFF launched the product within the Always Vanilla range in 2014.
Nootkatone	Flavour/fragrance currently isolated from grapefruit or produced chemically from valencene, which has been shown to have activity as an insecticide/insect repellent by the CDC (Center for Disease Control). Market price is c \$2,600/kg from a chemical process and c \$4,500 when extracted from grapefruit. Evolva obtained the marketed product with the acquisition of Allylix. Allylix has patented the use of >10% by weight of nootkatone as an insect repellent/pesticide.
Valencene	Flavour/fragrance currently isolated from oranges. Market price is \$500-1,200/kg. Evolva obtained the marketed product with the acquisition of Allylix.
Stevia products	High-intensity natural sweeteners. Evolva started developing a novel production method for a number of steviol glycosides (including Reb D and RebM) produced by the stevia plant for Abunda (acquired by Evolva in 2011). Evolva is continuing to optimise the yeast strain, while Cargill has initiated first scale-up testing. The programme was partnered with Cargill in March 2013, and Evolva has the option to form a JV (owning up to 45%) with Cargill to market the stevia products. Expected to be launched in 2016.
Saffron	High-value food ingredient, costs >\$1,500/kg, global sales c \$450m. Evolva has identified the pathways to make the three main chemicals found in saffron (crocetin, picrocrocin and safranal) and is now in pathway optimisation. Expected to be launched in 2016.
Santalol	Fragrance with insect repellent activity isolated from sandalwood. The sandalwood tree is slow growing and there are limited supplies from ethical/legal sources. Sigma Aldrich sells 100g of santalol for \$430. Evolva obtained the product from the acquisition of Allylix and expects to launch the product in 2017.

Source: Evolva, Edison Investment Research. Note: Evolva is no longer actively developing Pomecin A and B (potent anti-fungal molecules) and their further development depends on a partner being found.

Vanillin

Over the last year, Evolva achieved an important milestone with the launch of vanillin by IFF, under the brand name Always Vanilla. This was the first product to be launched that was made using yeast wholly developed by Evolva.

The segment of the vanilla market that IFF is targeting the Always Vanilla range of products is the high end of the c \$600m vanilla/vanillin market (source: Evolva). Less than 0.25% is derived from the vanilla orchid (cost: \$1,200-4,000/kg) and the rest is either chemically synthesised from lignin or hydrocarbons (eg guaiacol, cost: c \$5/kg) or made using a combination of chemical and enzymatic steps (cost: c \$750/kg). Always Vanilla will compete against brands such as Rhovanil Natural (high-quality synthetic vanillin) and marketed as natural vanilla flavour. IFF's competitive advantage is that it can produce natural vanilla at a lower cost than competitors in this niche. The flavour could become customisable as Evolva is developing manufacturing processes for the other vanilla-flavour compounds, although we do not expect Evolva's vanilla products to replace those from the orchid.

Resveratrol

Evolva re-launched its high-purity resveratrol in H214, after successfully improving the production yields of the yeast strain acquired from Fluxome (a private company) and thus lowering the manufacturing costs. Resveratrol is found in raspberries, blueberries and most notably red wine. It is purported to have many health benefits, including longevity and weight control. So far, resveratrol

is only generating modest sales, but we estimate that they will reach CHF1m in FY15 and increase to CHF36m in FY20. The growth is expected to come from market share gain and market growth (we estimate a CAGR of 18.9% between FY12 and FY20) driven by the perceived health benefits; the resveratrol market was estimated to be worth c \$50m in FY12 (Frost & Sullivan).

Nootkatone

Nootkatone is a flavour and a fragrance found in grapefruit, which has been shown by the Center for Disease Control (CDC) in the US to act as an insect repellent and be insecticidal. It is primarily produced by extraction from grapefruit or by the chemical conversion of valencene, costing c \$4,500/kg and \$2,600/kg (source: Isobionics). The current cost of the product means that its use is limited to the flavour and fragrance markets so far, however this could change if the compound became available at a much lower price, and in doing so we estimate that it would increase the potential market size from c \$100m to over >\$1bn.

The insect repellent market is still dominated by products containing DEET (N,N-Diethyl-methyltoluamide), which has an unpleasant smell, is oily and man-made. Nootkatone so far has been shown to be an effective repellent/insecticide against a range of insects including mosquitos (carriers of malaria and West Nile virus) and ticks (which cause c 30,000 pa of Lyme disease in the US, source: CDC). Nootkatone also has a pleasant citrus smell, is fast-drying and non-greasy, and is a natural product.

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 it 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 in August 2013 a worldwide [patent](#), which could be awarded in 2015, covering the use of a product with >10% by weight of nootkatone as an insect repellent or pesticide.

We estimate that Evolva's nootkatone sales will increase gradually to \$14m in FY17 with revenues primarily from the flavour/fragrance market. Subsequently, we forecast the sales growth to accelerate as nootkatone becomes used as an insect repellent more, so that peak sales of \$120m are achieved in FY22.

Valencene

Valencene is a flavour and fragrance extracted from oranges, and has a similar chemical structure to nootkatone (both are sesquiterpenes). The market price of valencene is only \$500-1,200/kg, the compound does not have the insect repellent activity of nootkatone, and DSM is distributing Isobionics' yeast-produced valencene. So, we are more cautious about the commercial potential of Evolva's valencene, and estimate that it will only achieve peak sales of \$10m after seven years in FY21.

Stevia

Evolva's main value driver is still its stevia programme, and the acquisition of Allylix has enhanced it further as its technology should improve the production yields. This makes it even more likely that Evolva will exercise its option in H115 to form a JV for 45% of the profits with its partner Cargill, an international food conglomerate (FY13 sales of \$137bn), to commercialise the various stevia products, ahead of launching the initial products in 2016.

In May, Evolva accomplished an important technical milestone, which we believe was the achievement of stevia sweeteners above certain commercially relevant yields during the scale-up phase. This leaves Evolva/Cargill on track to launch various stevia products in 2016. The stevia plant produces many different steviosides, 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. Evolva has not disclosed which of the steviosides are in development, but they include Reb A, Reb D and Reb M; a [patent](#) application covering the process for the production of the latter two compounds in yeast was published in August 2014. We estimate that Evolva can still earn milestones of c \$2m (of the total of up to \$7.5m) for the successful completion of the scale-up process.

Evolva raised CHF37m in equity in Q114 so that it was possible to enter the JV (we estimate that Evolva will have to invest c CHF25m during the initial one to two years of the JV). Our conviction that Evolva will exercise the option has been increased by the acquisition of Allylix, as it will take a year or so to incorporate Allylix's technology into the stevia production yeast strains, and Evolva will not be able to realise a return from improved production yields, unless it gains a share of profits through a JV. Without forming the JV, Evolva would only receive mid-single- to low-double-digit royalties (largely based on sales volumes), and Cargill would largely be the beneficiary of Evolva's acquisition of Allylix. Also, the two companies have formed a new collaboration for an undisclosed high-value food ingredient, which indicates that there is a good working relationship between them.

Evolva and Cargill are set to launch their stevia products at a time when demand for the sweetener 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 (down by 7% in FY13) because of health concerns, and have led to Coca-Cola launching Cola Life and stevia-flavoured Sprite in the US and Europe in H214 and Pepsi doing likewise with Pepsi True. These drinks have 30-40% less sugar than the sugar-sweetened products, with the use of stevia currently being limited by the bitter/liquorice aftertaste and we expect that the use of other steviosides (especially Reb M) will result in the greater use of stevia and the potential development of beverages sweetened solely by stevia products.

The use of stevia has been held back by the current production costs, as well as taste issues. The cost of producing Reb A 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 \$500/tonne for sugar in Europe, c \$400/tonne in the US, and \$650/tonne for HFCS) and most high-intensity sweeteners cost over a third less to produce. The cost of leaf-derived stevia will come down with the breeding of larger plants with higher levels of steviosides (eg GLG Tech's Huinong 3 strain) and improvements to the extraction process. However, it is difficult to believe that these changes will allow the halving of the price of Reb A, let alone production of other steviosides at prices comparable to those of sugar or HFCS. In 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 with Cargill, which has commercial relations with all food manufacturers, 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 Tech and Stevia First, but they all rely on the use stevia plants with complex extraction processes. So we expect Evolva/Cargill should 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).

Other

The other proprietary development programmes, which have been disclosed by Evolva, are saffron and, santalol (acquired with Allylix). We believe there are several other undisclosed programmes underway, which are significant value drivers, but are yet to be disclosed due to commercial reasons.

Partnerships

Evolva is also collaborating with companies to develop ways of producing other compounds in yeast (Exhibit 4). Evolva has tended to use partnerships to make compounds that need to be produced via a chemical pathway that Evolva has not already used for other products. These programmes are inherently more risky; and, although the financial return has been less than the company is able to make on proprietary programmes, Evolva 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 the company is in a stronger financial position, it is able to negotiate better terms and bear some of the financial risk (initial alliances included a fee-for-service element). In its most recently formed alliances with L'Oreal 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 with Cargill. Overall, Evolva should be able to make significantly better returns from the later partnerships.

Exhibit 4: Summary of corporate collaborations

Partner	Product areas	Notes
Ajinomoto	Personal care ingredient	A novel fermentation production process for a natural functional ingredient for use in personal care is being developed during 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. Initiated in January 2013.
BASF	Crop protection	Evolva is focused on the more promising of two programmes. 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. Initiated in March 2011.
Cargill	Stevia and undisclosed food ingredient family	Evolva is co-developing various stevia sweeteners with Cargill. Cargill has made a CHF4.5m equity investment in Evolva, bears its costs and could pay a further \$7.5m in milestones to Evolva during the development phase (Cargill is responsible for process development, scale-up and regulatory applications; and Evolva for yeast strain development). Evolva has an option to take up to a 45% stake in the final commercialisation of stevia, or to receive royalties (mid-single-digit to low-double-digit depending on volume and margin). Initiated in February 2013. In January 2015, a second collaboration was initiated covering an undisclosed high-value food and beverage ingredient family.
IFF	Vanillin	IFF launched Evolva's vanillin as Always Vanilla in 2014. The vanillin collaboration was initiated in January 2011 and was extended to include the second flavouring ingredient in May 2012, but the second collaboration was terminated in 2013.
L'Oreal	Ingredient for cosmetics	Evolva and L'Oreal 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.
Roquette	Food product ingredient	Evolva is developing novel biosynthetic production routes for an important food ingredient. The collaboration will run for 4.5 years. 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.
Takasago	Flavour/fragrance ingredients	Evolva will co-develop with Takasago 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. Final agreement expected to be signed in Q115.

Source: Edison Investment Research

Realising value from the legacy pipeline

Evolva is fully focused now on consumer products, following the partnering of the antibiotics in the EV-035 series (lead compound is GC-072) with Emergent Biosolutions. Both of Evolva's legacy pharmaceutical products are now partnered (Exhibit 5).

EV-077 was partnered with Serodus for the treatment of diabetic nephropathy in December 2013. Serodus is a small Norwegian biotechnology company focused on cardiovascular diseases. We expect Serodus to initiate a Phase II trial with the compound in 2016, although the company is yet to disclose development plans. Data from a Phase IIa trial (n=32) suggest EV-077 could be an efficacious treatment in diabetic nephropathy if a safety issue (elevated transaminase liver enzymes) can be overcome with lower doses of the compound, as predicted by PK/PD studies.

Preclinical studies with GC-072 have shown that it is a broad spectrum antibiotic, and active against *Burkholderia pseudomallei* (classified as a potential biothreat agent). Evolva was awarded a grant from the US Defense Threat Reduction Agency (DTRA) to fund preclinical development (see below), prior to the programme being licensed to Emergent Biosolutions in a \$70.5m deal.

Exhibit 5: Legacy (therapeutic product) pipeline

Product (partner)	Development stage	Indication	Notes
EV-077 (Serodus)	Phase IIa	Complications associated with diabetes (eg proteinuric renal disease, arterial thrombosis)	EV-077 inhibits activation of thromboxane A2 receptor by isoprostanes and prostanoids. It is being developed for diabetic nephropathy and has the potential to treat other complications of diabetes associated with vascular disruption. Successfully completed two Phase I trials. Initial results from 32 patients in Phase IIa (n=64) indicated that EV-077 is efficacious in treating/preventing platelet aggregation, improving peripheral blood flow and reducing proteinuria, although liver enzymes (transaminases) were elevated. Evolva might make milestone payments of up to \$1.5m and royalties of 1.5% on net sales to Bioligands for the product characterisation it carried out. Evolva could receive milestone payments for clinical and regulatory milestones and single-digit royalties on sales or 30% of Serodus's total licensing income if out-licensed.
GC-072, member of EV-035 family (Emergent Biosolutions)	Preclinical	Bacterial infections	Partnered with Emergent Biosolutions, with preclinical development funded by the US DTRA. GC-072 is a bacterial topoisomerase inhibitor (bactericidal), belonging to the EV-035 series of compounds (members of the 2-pyridones family). In vitro studies indicate that it is bactericidal against both Gram+ and Gram- bacteria. Evolva received a \$1.5m upfront with \$4m on approval by the DTRA of the transfer to Emergent Biosolutions; it could also receive \$65m in development milestones and royalties up to a maximum of 10% of net sales.

Source: Evolva, Edison Investment Research

Research collaborations support growth of Evolva

Evolva continues to use grant-funded research collaborations (Exhibit 6) as a source of non-dilutive funding where possible to enhance the capabilities of its technology platform and develop its pipeline. The company was successful in obtaining a grant of \$6.5m, with a potential further \$8.6m, from the DTRA to conduct preclinical development of GC-072, prior to the disposal of the programme to Emergent Biosolutions. In the current collaborations, which are funded by the European Commission and Danish government, Evolva's role is generally to use its expertise in modifying yeast to create new ways of producing compounds with potential health benefits.

Exhibit 6: Research collaborations

Collaboration	Total grant (funding body)	Start date	End date	Notes
BioPreDyn	€3.9m (European Commission)	Oct 2011	Mar 2015	An FP7 project to develop new bioinformatics methods and tools for data-driven predictive dynamic modelling in biotechnological applications. There are 11 participants in the collaboration; Evolva will receive c€0.2m in funding and will provide data for modelling, and specifying and testing the software.
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 IMI programme to develop a range of methods to make the drug development process more environmentally friendly. There are 21 participants, including GSK, Bayer, Janssen, Pfizer and Sanofi; Evolva will receive €0.4m in funding and will take part in one of six projects focused on generating various biosynthetic systems in yeast.
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 (9.8% of total €7.2m grant) 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.

Source: Evolva, Edison Investment Research. Note: FP7 = European Commission Seventh Framework Programme; IMI = Innovative Medicines Initiatives; Allylix also had various undisclosed research collaborations.

Evolva also has formed a collaboration with the Malaysian Biotechnology Corporation and Universiti Malaysia Pahang to investigate if the aromatic compounds found in Agarwood (a plant nearing extinction) can be produced in yeast.

Technology platform and production

All of Evolva's programmes (except resveratrol) have been developed using its proprietary yeast biosynthesis platform (Exhibit 7). Its technology involves combining genes from different organisms

in yeast to produce the compounds of interest in a natural and cost-effective process. Allylix made its compounds (including nootkatone and valencene) using a similar process, but while Evolva used a stochastic approach, Allylix followed a rational methodology. 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 genetically modified DNA.

Once the yeasts producing the product of interest have been generated, programmes move into the scale-up phase. During this stage, the fermentation process is scaled-up to bench production (<10L cultures), to pilot scale (<10,000L cultures) 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 of development, although the time taken can vary considerably.

Exhibit 7: 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 (YAC), so that the yeast strain makes the specific product. Evolva's core technology involves combining randomly hundreds of genes from different organisms together to form millions/billions of unique YAC. 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 of biosynthesis?	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 of them 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. There is additional IP protection afforded by the trade secrets associated with specific laboratory protocols.

Source: Edison Investment Research

Sensitivities

The main determinant of Evolva's prospects is its stevia programme. Many of the risks associated with the sweetener project have been reduced by the partnering with Cargill, which has considerable experience in fermentation and marketing food products and has commercial relationships with all major food and beverage manufacturers. However, the full potential of the product will only become apparent once the taste of the different stevia sweeteners (especially Reb D and Reb M) is better known. If the sugar sweetness can be replicated by various steviosides, the sweeteners could be widely used to replace sugar.

However, Evolva is not dependent on stevia. The resveratrol, nootkatone, santalol and saffron programmes in particular have significant commercial potential. Their potential depends on the competitive characteristics (including price) of Evolva's new production processes and thereafter improving manufacturing efficiency and introducing line extensions, and competition from other biosynthesis companies such as Amyris. In the case of resveratrol, future sales will also be influenced by the results of scientific studies to demonstrate the potential health benefits

There is limited market information for most of Evolva's products. So, 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 valuing Evolva, but also operational and working capital issues for the company as it needs to commission toll manufacturers to make the various products.

Valuation

We have raised our DCF valuation of Evolva from CHF1.73/share (CHF473m) to CHF1.82/share (CHF598m) as detailed in Exhibit 8, following the acquisition of Allylix and formation of the alliance with Takasago. The main changes to our valuation following the Allylix acquisition are the addition of nootkatone, valencene and santalol; increasing the expected peak gross margin from 50% to 60% (achieved after four years); and adjusting the exchange rate assumption from \$1/CHF to \$1.15/CHF after the Swiss Central Bank broke the peg to the euro. Other changes include increasing the value of EV-035 following the deal with Emergent Biosolutions and removal of Pomecin products (crop protection products) as Evolva has put their development on hold. Stevia remains the key product, at 47% (CHF278m) of our valuation (after adjusting for tax and capex).

Exhibit 8: Summary of DCF valuation

Product	Value (CHFm)	Value per share (CHF)	Notes
Stevia	357.3	1.09	Launch date: 2016; peak sales: \$400m; likelihood of success 80%; gross margin: 60%; profit share: 45%.
Saffron	169.8	0.52	Launch date: 2016; peak sales: \$200m; likelihood of success 60%; margin (costs and marketing): 40%.
Resveratrol	67.0	0.20	Launched; peak sales: \$40m; likelihood of success 100%; margin: 40%.
Vanillin	48.5	0.15	Launched; peak sales: \$200m; likelihood of success 100%; royalty: 5%.
Nootkatone	163.1	0.50	Launched; peak sales: \$150m; likelihood of success 75%*; margin: 40%.
Valencene	17.2	0.05	Launched; peak sales: \$10m; likelihood of success 100%; margin: 40%.
Santalol	42.4	0.13	Launch date: 2017; peak sales: \$50m; likelihood of success 60%; margin: 40%.
Legacy products	18.5	0.06	EV-077 – diabetic neuropathy; EV-035 – antibacterial indications.
L'Oreal/Takasago/Cargill revenues	67.8	0.21	Launch date: 2016-18; number of products: 5; peak sales: \$150m per product; likelihood of success: 50%; royalty: 8%.
Other alliance royalties	20.1	0.06	Royalties from alliances with Ajinomoto, BASF and Roquette; launch date: 2016-18; number of products: 4; peak sales: \$150m per product; likelihood of success: 60%; royalty: 2%.
Other revenues	31.1	0.09	Only includes revenues from existing collaborations and grants.
R&D and admin	(301.1)	(0.92)	
Tax	(128.4)	(0.39)	
Capex	(32.8)	(0.10)	Includes investment of \$25m for commercialisation of stevia with Cargill.
Net cash	57.2	0.17	Estimated net cash at FY14.
Total	597.6	1.82	

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 catalyst for Evolva's shares is expected to be the decision to enter a JV with Cargill to commercialise stevia. This would show that Evolva believes commercial production yields have been achieved and that Cargill has finalised its plans for the production, launch and marketing of stevia. Other catalysts in 2015 could be potential new corporate collaborations and financial results, which will indicate the progress of the launches of resveratrol, vanillin, nootkatone and valencene.

Financials

We have amended our estimates for Evolva as indicated in Exhibit 9, taking into account the H114 results, the company's recent financial update, the Allylix acquisition (negative impact in FY15e), change in exchange rate assumptions and licensing deal with Emergent Biosolutions. The acquisition of Allylix has the largest impact, as Evolva absorbs its cost base and launches nootkatone and valencene. Our FY15 revenue includes the \$4m milestone payment from Emergent Biosolutions due when the DTRA approves the transfer of the EV-035 programme, which we consider highly likely given Emergent Biosolutions' experience as a supplier of biodefence materials in the US. We also forecast product sales of CHF1.6m and CHF9.2m in FY15 and FY16.

The company had a cash position of CHF60.7m at 30 December 2014 after raising CHF4m in equity from Cargill in conjunction with the Allylix acquisition to largely offset the higher operational costs in FY15 (the acquisition is earnings enhancing in subsequent years). We now expect the company to become cash generative a year later in FY17, after taking into account the launch costs

and inventory building, and that the gross margin on stevia will gradually improve as volumes grow. So, we estimate that the company will have to raise c CHF20m by the end of FY16 (to fund various programmes and maintain adequate cash reserves), but that this could be in the form of non-dilutive sources – debt or further product deals.

Exhibit 9: Summary of changes to estimates

	Sales (CHFm)			PBT (CHFm)			EPS (c)		
	Old	New	% chg.	Old	New	% chg.	Old	New	% chg.
2014e	9.6	10.1	5.2	(20.1)	(21.0)	N/A	(7.1)	(7.4)	N/A
2015e	10.3	15.6	51.7	(19.2)	(25.3)	N/A	(6.5)	(7.7)	N/A

Source: Edison Investment Research

Exhibit 10: Financial summary

	CHF'000s	2011	2012	2013	2014e	2015e	2016e
Year end 31 December		IFRS	IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS							
Revenue		11,080	7,014	8,706	10,095	15,621	21,438
Cost of Sales		0	0	0	0	(987)	(4,579)
Gross Profit		11,080	7,014	8,706	10,095	14,634	16,859
EBITDA		(22,447)	(16,684)	(14,311)	(19,198)	(19,744)	(19,465)
Operating Profit (before GW and except.)		(24,923)	(18,009)	(15,685)	(20,517)	(24,989)	(24,233)
Intangible Amortisation		(1,012)	(1,960)	(2,002)	(1,985)	(1,982)	(1,982)
Exceptionals		0	0	0	0	0	0
Operating Profit		(25,935)	(19,969)	(17,687)	(22,501)	(26,971)	(26,216)
Net Interest		(614)	(659)	(514)	(528)	(311)	(392)
Other financial income		2,494	2,557	165	0	0	6,261
Profit Before Tax (norm)		(25,537)	(18,668)	(16,199)	(21,044)	(25,300)	(18,364)
Profit Before Tax (FRS 3)		(24,055)	(18,071)	(18,036)	(23,029)	(27,282)	(20,346)
Tax		1,122	1,502	1,860	616	0	0
Profit After Tax (norm)		(21,440)	(14,045)	(13,730)	(20,143)	(25,300)	(24,625)
Profit After Tax (FRS 3)		(22,932)	(16,569)	(16,176)	(22,413)	(27,282)	(20,346)
Average Number of Shares Outstanding (m)		156.4	173.3	227.5	269.1	327.6	327.6
EPS - normalised (c)		(13.4)	(7.8)	(5.8)	(7.4)	(7.7)	(7.5)
EPS - FRS 3 (c)		(14.4)	(9.2)	(6.9)	(8.2)	(8.3)	(6.2)
Dividend per share (c)		0.0	0.0	0.0	0.0	0.0	0.0
Gross Margin (%)		N/A	N/A	N/A	N/A	N/A	N/A
EBITDA Margin (%)		N/A	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	N/A
BALANCE SHEET							
Fixed Assets		81,981	78,914	74,989	132,618	133,113	145,114
Intangible Assets		68,826	66,669	63,342	90,919	88,937	86,955
Tangible Assets		10,822	9,942	9,319	38,582	34,059	30,042
Other fixed assets		2,333	2,303	2,328	3,117	10,117	28,117
Current Assets		24,515	11,459	30,282	62,730	31,141	20,178
Stocks		46	60	56	66	5,140	5,018
Debtors		1,019	799	352	1,660	3,424	4,699
Cash		22,694	10,105	29,285	60,694	22,267	10,150
Other current assets		756	495	589	310	310	310
Current Liabilities		(7,563)	(10,134)	(8,591)	(14,023)	(8,588)	(8,349)
Creditors		(1,741)	(1,015)	(859)	(6,752)	(1,238)	(1,284)
Short term borrowings		(2,628)	(4,740)	(3,652)	(3,522)	(3,392)	(3,262)
Finance lease obligations		(338)	(246)	(338)	(364)	(364)	(364)
Other current liabilities		(2,856)	(4,133)	(3,742)	(3,384)	(3,594)	(3,439)
Long Term Liabilities		(21,947)	(15,406)	(9,946)	(9,375)	(9,375)	(29,375)
Long term borrowings		(2,200)	0	0	0	0	(20,000)
Finance lease obligations		(3,765)	(3,595)	(3,454)	(3,082)	(2,718)	(2,355)
Other long term liabilities		(19,747)	(15,406)	(9,946)	(9,375)	(9,375)	(9,375)
Net Assets		76,985	64,833	86,735	171,950	146,291	127,567
CASH FLOW							
Operating Cash Flow		(17,028)	(13,017)	(12,116)	(12,990)	(29,900)	(12,480)
Net Interest		(374)	(429)	(408)	(188)	(311)	(392)
Tax		0	0	0	0	0	0
Capex		(965)	(580)	(796)	(695)	(722)	(751)
Acquisitions/disposals		0	0	0	0	0	0
Financing		921	1,928	37,246	48,527	0	0
Other cash flow		2,718	(1,234)	(2,738)	(3,231)	(7,364)	(18,364)
Net Cash Flow		(14,729)	(13,332)	21,189	31,423	(38,297)	(31,987)
Opening net debt/(cash)		(37,715)	(17,866)	(5,365)	(25,633)	(57,172)	(18,875)
Other		(5,121)	832	(921)	115	0	0
Closing net debt/(cash)		(17,866)	(5,365)	(25,633)	(57,172)	(18,875)	13,112

Source: Evolva accounts, Edison Investment Research

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

CAGR metrics	Profitability metrics	Balance sheet metrics	Sensitivities evaluation
EPS 12-16e	N/A ROCE 15e	N/A Gearing 15e	N/A Litigation/regulatory
EPS 14-16e	N/A Avg ROCE 12-16e	N/A Interest cover 15e	N/A Pensions
EBITDA 12-16e	N/A ROE 15e	N/A CA/CL 15e	N/A Currency
EBITDA 14-16e	N/A Gross margin 15e	N/A Stock days 15e	N/A Stock overhang
Sales 12-16e	32.2% Operating margin 15e	93.7% Debtor days 15e	N/A Interest rates
Sales 14-16e	45.7% Gr mgn / Op mgn 15e	N/A Creditor days 15e	N/A Oil/commodity prices

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 was 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 Almiral and UCB.

CFO: Jakob Dynnes Hansen

CFO since September 2007. He has worked in the sector for over 20 years. Prior to 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	4.41
Sunstone Life Sciences	3.86
BASF Venture Capital	3.76
Malaysian Life Sciences	3.44
Cargill Inc	3.28
Malaysian Technology Development Corporation	3.00
Wellington Partners	2.19

Companies named in this report

Ajinomoto (JP:2802), Amyris (NASDAQ:AMRS), BASF (FRA:BAS), Cargill, Coca-Cola Enterprises (NYSE: CCE), DSM (NA:DSM), Emergent Biosolutions (NYSE:EBS), International Flavors & Fragrances (NYSE: IFF), L'Oréal (FP:OR), PepsiCo (NYSE:PEP), PureCircle (LON: PURE), Roquette, Solazyme (NASDAQ:SZYM), Stevia First (OTC:STVF), Takasago(JP:4914)

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