ESTIMATES

VALUE RANGE GBp 232 – 242

CELLTHERAPY
REGENERATIVE MEDICINE FOR LIFE

Wednesday, 22 July 2015

Implied Intrinsic Price	£237.41
Value Range Low	£231.48
Value Range High	£243.35
Implied MCAP (m)	£431.37
Implied EV (m)	£431.61
AIM Index	CTL LN
Financial YE	31-Jul
Currency	GBP

Business Activity
Biotech regenerative medicine

Key Metrics

Close Price	£37.00
MCAP (m)	£67.23
Net Debt (Cash) (m)	£0.244
EV (m)	£67.47
52 Wk Hi	£37.00
52 Wk Lo	£37.00
Free Float	9.27%

Key Ratios

Net Debt (Cash) / Equity %	0.36%

Pharma Sector Research
AIM Index expected
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Cell Therapy Pre-IPO Valuation

Heart of the matter – regenerative medicines

Cell Therapy Ltd (CTL) is a biotech regenerative healthcare platform play with novel stem cell medicines. CTL possesses a proprietary process, extracting novel stem cells from donated blood. In just 6 years the company has rocketed through discovery and development and is rapidly approaching marketing for Heartcel™, which is the only medicine close to market launch to use heart specific stem cells to treat cardiac disease. Heartcel™ is the first of four CTL clinical pipeline stem cell medicines. CTL closed a GBP 650k crowd funded placement end 2014 within 2 weeks. Based on management discussions we infer CTL has strong instituional interest for a second significant investment round.

- Novel heart muscle specific stem cell medicine for cardiac diseases
- 20-50% market share potential without US/EU orphan designation
- No direct competition
- Successful GBP 650k crowd funded placement
- Dramatic FCF positive inflexion FY18E

ACF est. GBP (k)	Revenue	EBITDA	FCF	EPS	EPS (diluted)
2017E	66,038	30,214	-971	138.5	126.8
2018E	461,927	220,514	122,276	1,054	965

Multiples	EV/ Revenue	EV/ EBITDA	EV/ FCF	P/ EPS	P/ EPS (diluted)
2017E	1.02x	2.23x	-69.49x	0.27x	0.29x
2018E	0.15x	0.31x	0.55x	0.04x	0.04x

Share Price History	No. of Shares in issue	Fully diluted
NoSh (m) 20/07/15	1.817	1.985
Implied Intrinsic Price	£237	£217
Value Range Low	£231	£212
Value Range High	£243	£223
AIM Ticker	N/A	
Financial YE	31-Jul	
Reporting Currency	GBP	
NoSh (m) 20/07/2015		1.817
NoSh (m) expected dilution (Exp D)		1.985
NoSh (m) full dilution (FD)		1.985

Key Metrics		adj.
MCAP (m)	£67.2	£67.2
Net Debt (Cash) (m)	£0.24	£0.24
EV (m)	£67.5	£67.5
52 Wk Hi	£37.0	£33.9
52 Wk Lo	£37.0	£33.9
Free Float	9.3%	9.3%

*Key Metrics FCF adj.	2016E	2017E
CPS (GBp)	-5.34	672.97
CPS (Exp D) (GBp)	-4.89	615.90
CPS (FD) (GBp)	-4.89	615.90
P/CPS	-6.92x	0.05
P/CPS (Exp D)	-7.56x	0.05
P/CPS (FD)	-7.56x	0.05

*Note that in the table above we show unlevered Free Cash Flow Per Share (CPS) based upon current NoSh, expected dilution (Exp D) and full dilution (FD). P/CPS uses the implied close price as per front page and this page.

Heartcel™ – potentially huge savings for health service providers and insurers.

Investment Case

- **Competitive background** – The stem cell regenerative medicine market for treating Heart Failure (HF) is dense with competition. However CTL's approach has no direct competition. CTL's medicine is novel because it uses adult (not embryonic) allogeneic (from same species) heart-specific stem cells and is 'off-the-shelf'. CTL expects to start marketing its Heartcel™ medicine during 2017. MyoCell, from Bioheart of the USA, is the most significant indirect competitor already in PIII trial. Bioheart's MyoCell is a general muscle stem cell, is not heart specific and is autologous (intensive processing of the patient's own cells).

Whilst research scientists are enthusiastic about MyoCell's approach, clinicians are less so. We estimate there are 11 competitors to CTL, but none appear to be developing heart-specific stem cells to treat HF. Indirect competitor Mesoblast is pursuing an allogeneic medicine expected to market in 2019, two years after CTL.

The competition is proposing to use non-heart specific stem cells, which some might characterise as…the wrong cell in the wrong place. CTL's 'off the shelf' heart-specific stem cell medicine, injected directly into the damaged heart looks like the right cells in the right place. NYHA IV HF patient costs - estimated at USD 150k p.a.. Heartcel™, a one hit, off the shelf medicine, **fractions the p.a. cost**.

- **Proven performance** – In 6 years CTL has discovered and researched four regenerative medicine products and closed a significantly oversubscribed private placement in the crowd funding space for GBP 650k.

- **Strong management** – CTL's 10 strong Impressive leadership team includes five distinguished academics and two seasoned pharmaceutical executives.

- **Pipeline medicines** – CTL has identified >12 tissue-specific stem cells from its proprietary approach and has four cellular products under clinical development. **Heartcel™** for the treatment of HF is the closest to coming to market - Direct marketing 17E. CTL's expected follow up product, **Myocardion™**, is an HF regenerative medicine using catheter delivery aimed at less severe HF conditions.

The third release is expected to be **Tendoncel™**, a topical stem cell medicine under development for tendon repair (1m tendon repairs in US and Europe p.a.). Initial PII tendon repair results were recently presented at the International Society of Stem Cell Research - the data looks supportive. The fourth medicine, **Skincel™,** for cosmetic indications, is undergoing a PII trial. The pre-clinical pipe includes a medicine for type 1 diabetes (estimated by management to be a multi-billion USD market); and **oncology** - global market in excess of USD 50bn.

Catalysts

Heartcel™ and Myocardion launches; Positive Tendoncel™ PII trial results; Raising GBP 40m; listing on a market such as London's AiM; a secondary listing on US technology market Nasdaq; FCF positive FY18E.

Operational Strategy

Niche Orphan populations.

High unmet medical needs.

CTL's overarching strategic approach is to focus upon niche (orphan) populations with high unmet medical needs. This strategy, if successful, will allow CTL to accelerate its route to market. If CTL establishes compassionate use programmes this can fuel-inject revenue growth through exposure of CTL's medicines to a network of world-class clinical partners (dominant influencers), who may then promote CTL's medicines.

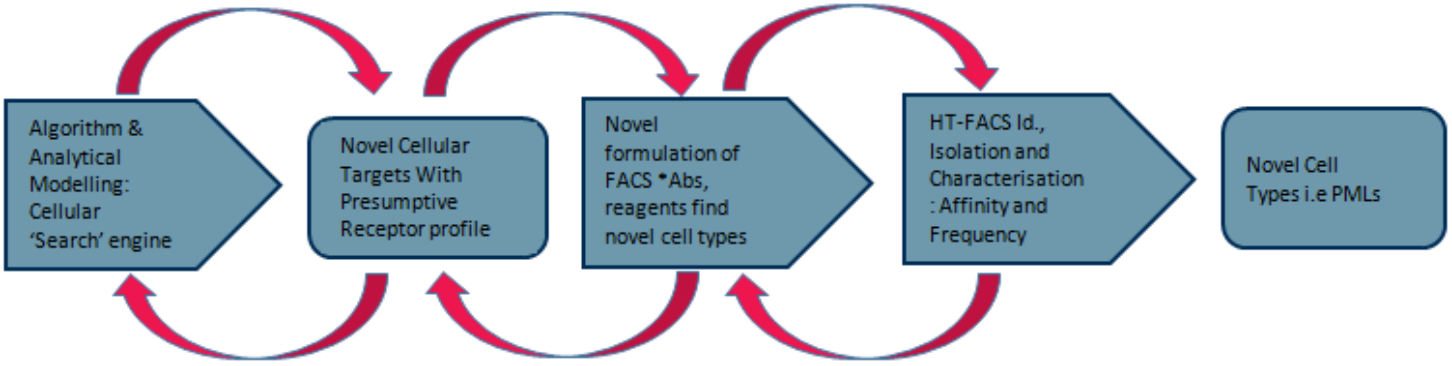
Defensible IP.

We identify four key strategic elements to CTL's strategy: intellectual property (IP); management; distribution; best-in-class medicines/products.

Novel technology platform.

CTL has created attractive **IP** in the life sciences sector in regenerative cell medicine providing it with the capability to identify tissue-specific allogeneic stem cell medicines. The Company is now developing these medicines and will finally sell direct or license to pharmaceutical partners. Management states that the discovery platform was developed from Nobel prize winning research by CTL co-founder and CSO Prof. Sir Martin Evans.

Exhibit 1: **CTL's novel technology platform Enhancel™**



Source: Company Reports; KPMG; ACF Equity Research. *Antibodies

Highly credible management and research team profiles.

CTL has assembled a highly credible **leadership team**, which should make CTL attractive to finance and improve probability of delivering high returns in a compact timescale.

Upon regulatory approval, CTL will sell its off-the-shelf adult stem cell medicine direct to US and European leading Heart Transplant centres and by **distribution** partners to RoW.

Best in class medicines – 4 medicines in late stage clinical trials.

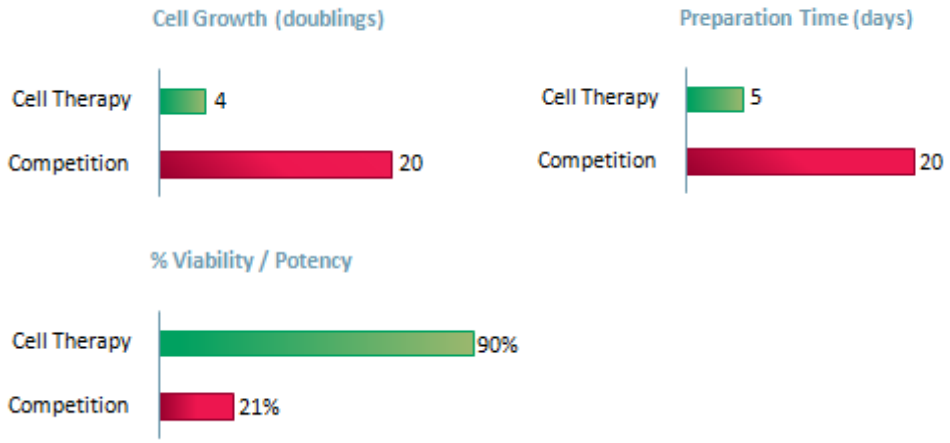
CTL has four products in clinical trials. The company is prioritising the 'bring-to-market' process of its **best-in-class** product, Heartcel™, its 'off-the-shelf' in-situ specific stem cell medicine effecting the regeneration (read repair) of damaged (scarred) heart tissue. Heartcel™ has successfully completed its PIIa clinical trials.

Substantive markets.

Heartcel™ is targeted at the most severely affected 'orphan' populations with congenital heart abnormalities. This population subset is part of the more general US and European population of 20m HF patients. CTL's Heartcel™ medicine aims to treat patients that require open heart surgery to bypass coronary arteries. There are some 800k heart bypass operations p.a.. Although the numbers are subject to debate approximately 300k operations do not lead to the desired clinical outcome – re-vascularisation of the heart.

Exhibit 1: **CTL's novel Enhancel™ performance vs. competition**

Enhancel™ platform CoS is an industry competitive advantage.



Source: Company Reports; ACF Equity Research

Medical breakthrough - Heartcel™ does not patch the damaged heart tissue…it regenerates it.

Heartcel™ clinical trials indicate the medicine has efficacy in the field of heart muscle tissue regeneration, which conveys two advantages to Heartcel™. First, it represents a significant medical breakthrough. Second, it puts the product at the forefront of regenerative medicine, in the judgement of the board. As a result CTL is positioning Heartcel™ as an orphan drug for an orphan indication, which if achieved will mean it is likely to qualify for **compassionate use** programmes, which may commence during 2016. CTL is aiming to obtain its marketing licences in the US and UK markets for 2017.

Exhibit 2: **CTL's pipeline behind Heartcel™**

Not a one trick pony – pipeline in clinical trials and pre-clinical pipe

Product	Indication	Stage	Next Milestone	Launch Date
Myocardion™	▪ Heart Failure (administered by catheter) ▪ Focus on Broader heart failure market	Phase III	Phase III completion	2018
Tendoncel™	▪ Tennis Elbow ▪ Tendonitis	Phase II	Phase II completion-June 2015 (Tennis Elbow)	2018-19
Skincel™	▪ Wrinkles ▪ Scarring ▪ Vaginal Atrophy ▪ Diabetic Foot Ulcers	Phase II	Phase II completion-June 2015 (Wrinkles)	2019
Other	▪ Oncology ▪ Type 1 Diabetes ▪ Liver Fibrosis	Discovery	Start Phase I/II Trial	N/A

Source: Company Reports; ACF Equity Research

Marketing Strategy

CTL has five elements to its Heartcel™ marketing strategy:

- Orphan drug status;
- Best-in-class;
- Off the shelf medicine;
- Compassionate use programme;
- Education and communication for clinical staff.

Orphan drug – CTL is applying for orphan drug status for the Heartcel™ regenerative medicine specific stem cell medicine. Achieving orphan status should close the door on most of the potential competition, certainly over our five-year horizon, as orphan drug status conveys 7-12 years of exclusivity in the EU and USA.

Strictly speaking with respect to CABG, the Orphan condition affects only ~2.02 per 10k patients or ~75-100k patients p.a.

In the US, management estimates that there are 350K CABG operations p.a., and 37% of these are in patients at risk of incomplete re-vascularisation (IR), equating to a target market of 130K patients. In Europe, the number of CABG operations approaches 200k p.a., with an addressable IR population of 75k-100k. Both of these populations are below the qualifying limits of an orphan disease.

100% MACE free survival 19-24m post treatment.

Best in class – Heartcel™ has demonstrated leading efficacy results in PII trials, with 100% MACE (see glossary) free survival after an average of 24 months post operation. The medicine has demonstrated the **first human heart regeneration**. Heartcel™ should also deliver high gross margins, with low Cost of Sales (estimated by the Company at <10% of the unit price of the medicine). Once regulatory approval is achieved, Heartcel™ will be shipped direct in the US and Europe to leading Heart Transplant centres and by distribution partners around the rest of the world.

Heartcel™ was tested in a PII open label clinical trial looking at:

1) MACE free survival after 12 months post treatment;

2) level of heart function improvement (as measured by LVEF improvement);

3) scar size reduction and improvement in quality of life for patients;

4) Patients were subsequently tracked for a minimum of 18 months.

Heartcel™ is the only medicine targeting patients with coronary artery abnormalities leading to severe HF NYHA IV.

Heartcel™ demonstrated both statistically significant and clinically significant improvements in each of these four endpoints. Heartcel™ is the only medicine targeted at severe HF NYHA (see glossary) segment IV patients. CTL's Myocardion medicine is targeted at HF NYHA segments II and III and as such is a direct competitor to Mesoblast.

- 100% MACE free survival after 19-24 months, with no cardiac related readmissions.
- 30% LVEF relative improvement from baseline measured by ECHO at 12 months.
- 40% LV scar size reduction measured by SPECT scan at 6 months post operation.

50% improvement in quality of life at 12m.

- 50% improvement in Quality of Life as measured by the MLHF score at 12 months, increasing to 70% improvement at 18 months.

Off the shelf.

Off the shelf – CTL's Heartcel™ medicine takes between 5-10 minutes to administer, according to management, during open-heart surgery via injection into the tissue surrounding the scar of the heart. The key to leveraging this and other CTL competitive advantages is to build the clinical staffing relationships.

Exhibit 1: **CTL phase III trial and competitors**

Product, Company and Region	Primary indication	Current Phase
Heartcel™ – specific allogeneic stem cells (Cell Therapy, UK)	*Heat Failure (HF)	EU registration; Financing US Phase III
Myocell (Bioheart, USA)	HF	Phase III
Mesenchymal stem cells (CardioCell, USA)	Myocardial infarction	Phase III
Mesenchymal stem cells (Mesoblast, Australia)	HF NYHA class II & III	Phase III
C-Cure (Celyad, Belgium)	HF	Phase III

Source: Company Reports; KPMG; ACF Equity Research;
* Explicitly CTL's Heartcel™ primary indication is: congenital coronary artery malformation.

Compassionate use.

Compassionate use programme – The company will market the use of Heartcel™ to the most ill heart damage patients with very poor life expectancy.

5-10 minutes to administer during surgery.

The advantage of a compassionate use programme strategy is that it will give access to Heartcel™ to the most credible surgeons helping the most unwell people allowing CTL to create a top level global advocates group at an early stage in the market development. This strategy improves the probability of a rapid growth rate for the medicine and a market dominant position prior to commercial launch in the EU and the US in 2017 and Asia and RoW in 2018.

CTL has not included the compassionate use programme revenues in its financial forecasts (and they are in terms of the aggregate revenue forecasts unlikely to be significant), nevertheless the programme is strategically important.

Management's carefully defined series of strategic steps should allow it to win revenues of up to GBP 2.5bn by 2020 based upon a market of 20m patients with moderate HF.

Education and communication – CTL plans to educate a sophisticated audience in 31 European centres of cardiac care excellence. This audience must be

1) made aware;

2) trained;

3) find the medicine available.

Awareness will be created through a programme of road shows hosted by key opinion leaders and key research at the point of commercial launch.

CTL's single most significant challenge relates to the post launch phase of Heartcel™. The company has to be able to differentiate its medicine from the incumbent alternatives and upcoming competition.

Plenty of potential upside not in our model e.g. Tendoncel™.

Tendoncel™ potential upside – CTL recently announced strong initial PII results for its topical cell medicine for severe tendon injuries, Tendoncel™. The product consists of cells held in an innovative gel delivery system, which is applied by the patient topically for 21 days. Because the product is topical it could potentially be prescribed by GPs rather than orthopaedic surgeons. Currently orthopaedic surgeons administer steroid injections and execute tendon surgery, the two key competitors to Tendoncel™.

The results of the Tendoncel™ PII trials demonstrated statistically and clinically significant improvements in patient reported experience of severe lateral epicondylitis vs. placebo after six weeks of treatment.

There are around 1.5m severe tendon damage patients in the US and Europe that suffer from severe injuries of the shoulder, elbow or Achilles, which currently require surgery. This represents a potential opportunity of up to GBP 900m in peak sales, according to management. Management's valuation of the market is based upon a peak market share of 30% as calculated using the BCG Value Capture Matrix, published in Nature Reviews (July 2013).

The tendon injury market is too large for CTL to commercialise Tendoncel™ itself, given its current scale and access to capital. However, the Company states that it is in discussions with potential licensing partners to address this limitation.

We have not included Tendoncel™ revenues in our valuation model and a licensing deal could potentially provide upside to our current valuation (see financial analysis, revenues below). Full phase II results at three months post treatment are expected during August 2015.

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Therapeutic Approach

Efficacy – The effectiveness of a medicine in comparison to potential and actual competitors is determined by comparing the medicine to the standards and protocols typically used by the regional licensing agencies. For example, of the four PIII trial competitors in exhibit 4 above, two are using an autologous (see glossary) approach – Bioheart's MyoCell and Celyad's C-Cure therapies.

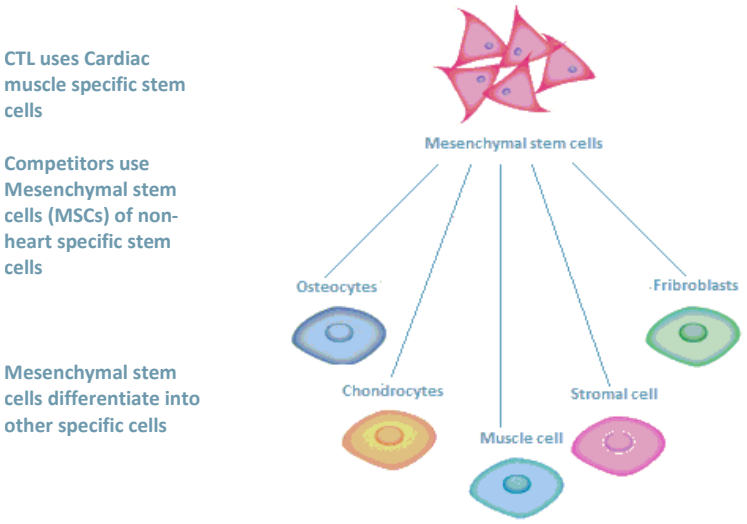
Leaves the competition stranded?

According to a recent Cochrane Review, cited by management, autologous treatments have a very low volume of effect, typically just 1-2 points improvement in a sample of 1,255 patients. In other words a large number of autologous cell therapies will not generate a profound improvement in LVF (see glossary).

Bioheart's MyoCell, which could be viewed as CTL's Heartcel™ most immediate and credible competitor, relies on the theory that a muscle stem cell, when injected into the heart, becomes a heart cell. Research scientists are well disposed towards this approach because it suggests one solution for many situations. Clinicians are opposed to such approaches, according to management, because a one-size-fits-all approach tends to end in disappointing levels of efficacy (read failure).

Autologous therapies such as MyoCell attempt to repurpose stem cells from other parts of a patient to treat the scar on the patient's heart that is causing the heart failure. This results in a painful bone marrow extraction procedure for patients that are already ill. In addition the procedure is expensive to deliver and minimally effective at best.

Exhibit 1: **Competitors to CTL are using Mesenchymal stem cells (MSC)**



Source: ACF Equity Research

iMP is a novel cell class.

Off-the-shelf – CTL has developed Heartcel™ to be highly specific to the heart. It is a type of stem cell called an immunomodulatory progenitor cell (iMP) and is a novel and distinct mesodermal progenitor cell discovered and isolated by CTL with cardiac-specificity for cellular medicine in cardiac regeneration.

Efficacious elegant science.

Immunomodulatory progenitor cells (iMPs) are not mesenchymal stem cells (MSCs) as defined by the International Society for Stem Cell Research (ISSCR) consensus definition of MSCs. iMP cells were found, by flow cytometry (FACS) analysis, to be a distinct population of cells different to MSCs. Comparison of the cell surface marker expression utilizing flow cytometry found 10 markers are significantly up-regulated (>15 fold increase) in expression vs. MSCs.

CDs are clusters of differentiation on a cell surface and are involved in triggering the immune response waterfall.

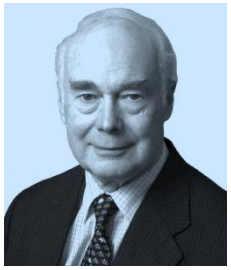
CD304 for exmaple is known as the the CD304 antigen and is encoded for by the CD304 gene.

In particular, the iMP cell surface marker expression profile consists of MIC A/B, CD304 (Neuropilin 1), CD178 (FAS ligand), CD289 (Toll-like receptor 9), CD363 (Sphingosine-1-phosphate receptor 1), CD99, CD181 (C-X-C chemokine receptor type 1; CXCR1), epidermal growth factor receptor (EGF-R), CXCR2 and CD126. iMPs do not express Stro-1/Stro-3. Up-regulation of these markers has been reported to show greater functional properties such as cardiac specificity and immune-modulation.

The specificity of Heartcel™ vs. its nearest allogeneic competitor is clear when considering the number of cells required to treat an individual patient – 2-4m for Heartcel™ vs. 150m for competitor Mesoblast's therapy.

Management Team

➢ President and Co-Founder, Professor Sir Martin Evans.



President and co-founder Sir Martin Evans, is also CTL's Chief Scientific Officer. Sir Martin was made a Nobel Laureat for Medicine for his pioneering work in indentifying stem cells in 2007 and received the Copley Medal from the Royal Society. He received the Albert Lasker Award in 2001.

Sir Martin along with Matthew Kaufman, was the first to culture mice stem cells and cultivate them in a laboratory in 1981. His life science research reputation is also built upon the work he carried out in conjunction with Mario Capecchi and Oliver Smithies, on the development of the knockout mouse and the related technology of gene targeting, a method of using stem cells to create specific gene modifications in mice.

Sir Martin is also Chancellor of the University of Cardiff and remains an active and committed President and Chief Scientific Officer, leading CTL's scientific activities.

➢ CEO and Co-Founder, Ajan Reginald.

Mr. Reginald co-founded CTL in 2009 after his time as Head of Emerging Technologies and Business Development Director at listed Swiss Bio-Pharmaceutical giant Roche. Ajan provides pharmaceutical and business expertise, to the Company in addition to his responsibility for its day to day leadership.

Ajan began his career as a deal maker for Roche Pharmaceuticals, becoming a Business Development Director. He led the valuation and acquisition of medical companies and medicines in clinical trials, encompassing major licensing transactions and including the USD 1.3bn licensing transaction with Alnylam. Ajan was promoted to Global Head of Emerging Technologies and assessed 100s of potential breakthrough technologies whilst at Roche.

Prior to Roche, Ajan was a consultant at Boston Consulting Group (BCG) in the Biotech and IP practice. Ajan trained as a dentist, leaving the profession in 2002. He won the Fulbright Scholarship for an MBA at Kellogg Business School where he also won the Biotechnology scholarship.

➢ CFO, Mark Hughes

Mark Hughes qualified as a Chartered Accountant with Price Waterhouse. Mark has been a board director for over 20 years and Group CFO in three full-list public companies (Hall Engineering, Axon & Royal Doulton).

Mark joined CTL from his position as CFO of AiM listed Mediwatch, a supplier of urology equipment and biomedical PSA tests. Previously he was employed by blue chip companies such as Rolls Royce, Glynwed and EMCOR and with healthcare sector company STERIS.

Mark is an FCA, holds an MBA from Warwick University and an undergraduate degree in banking and international finance from City University, London.

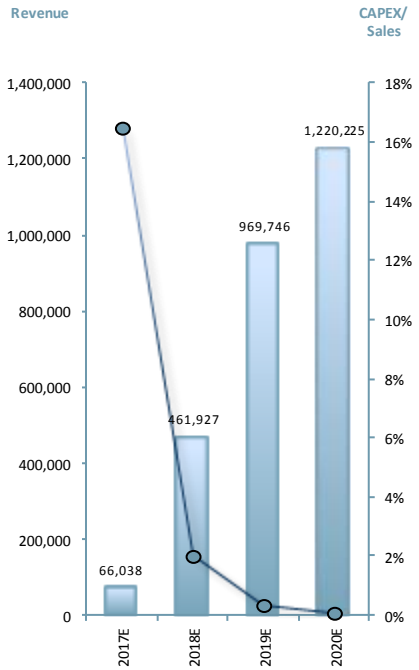
➢ Director, Corporate Development, Mark Beards

Mark Beards brings over 20 years experience in the life sciences and financial sectors. He is a qualified Chartered Management Accountant. Mark was most recently Director of Life Sciences Strategy at KPMG. However he has also worked in sales, marketing and R&D roles at Abbott Laboratories and London listed pharma giant GlaxoSmithKline. He brings a significant amount of life science strategic consulting experience from McKinsey & Company, and as co-lead for life sciences strategy at Charles River Laboratories.

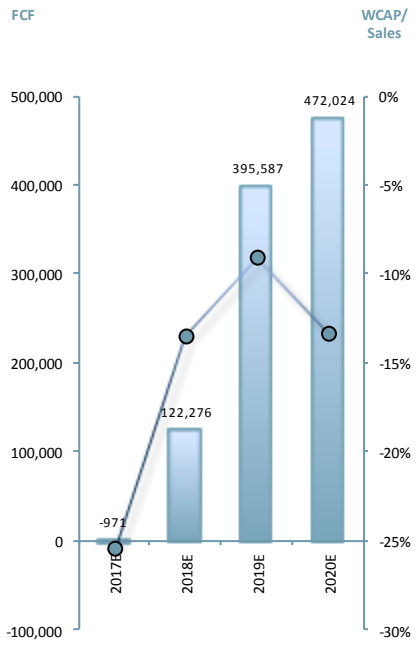
Mark was the Head of Healthcare Equity Research at integrated global investment bank Goldman Sachs, where he built a new team focused on the European pharmaceutical, biotechnology and medical technology sectors. Mark holds a BA (Hons) and MA in Mathematics from The Queen's College, Oxford University.

Forecasts

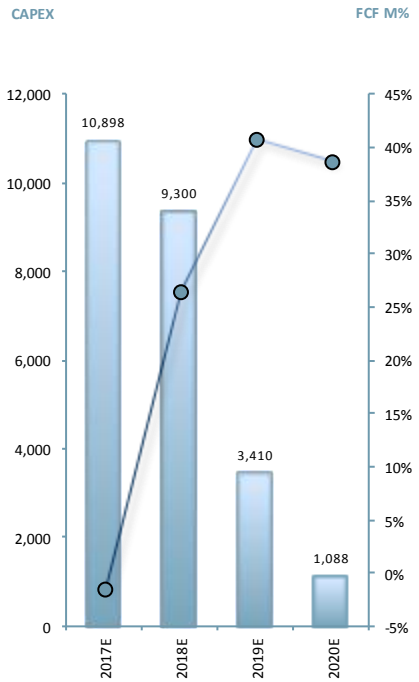
Revenue growth accelerates dramatically from FY17E.



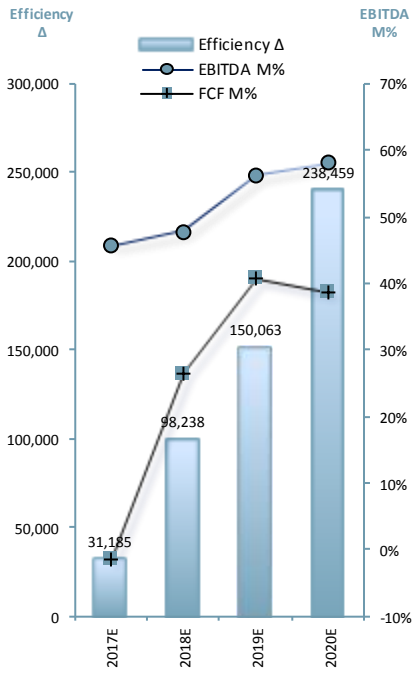
Dramatic FY18E FCF inflexion point.



Capex intensity falls away during FY18E.



Attractive EBITDA to FCF conversion efficiency.



Our forecasts are based upon management guidance and our own sensitivity analysis. We focus on cash proxies (EBITDA) and free cash flow (FCF). We are also strongly of the view that only cash matters.

Valuation Pre New Money

5-year forecast horizon, discounted TV captures post horizon value.

ACF est. GBP (k)	2015E	2016E	2017E	2018E	2019E
Revenue	0	1	66,038	461,927	969,746
EBITDA	-1,134	-16,380	30,214	220,514	545,650
Net Income	-1,141	-16,768	25,168	191,554	498,915
FCF	-1,274	-29,869	-971	122,276	395,587
CPS (diluted)	-7.01	-150.45	-4.89	615.90	1,992.56

Note: FY15E is not included in our FCF forecasts extending to FY20E as FY15 has closed and is in the past.

Debt to equity mix zero.

Risk adjusted WACC 56.83%

CTL LN WACC Calc	*ERP LN
Pre-tax cost of debt	9.0%
ETR	22.6%
After-tax cost of debt	7.0%
Current Leverage	
Debt	0.4%
Equity	67,228
Target Leverage	
D / (D+E)	0.0%
ACF β adj levered	2.33
rf	1.91%
Rm	8.1%
ERP	6.2%
Cost of equity	16.38%
Risk adj.	40.00%
WACC	56.38%

*Bloomberg ticker indicates ACF market ERP

Note: Listing on a public market systematically reduces Kd and Ke vs. private companies and creates a liquidity event.

CTL has achieved **EIS status** for investors under Section 306(2) ICTA 1988 in respect of funds raised via its GBP 650k crowd funding private placement. However there is no guarantee that the status will be remain and may be revoked after the current funding round of GBP 40m.

We have used an **implied beta** of 2.33 in this note reflecting our observation of volatility on the AIM market. Our choice of beta also reflects our assessment of the greater potential outperformance of the stock vs. the market.

Valuation Range		
NPV uFCF (k)	128,743	
NPV TV uFCF (k)	302,870	
EVF (k)	431,612	
TV Mulitple	6.0x	
% TV of total NPV	70.17%	
Net Debt (k)	244	
Fair Value (k)	431,368	
NoSh (m)	1.82	
NoSh (diluted) (m)	1.99	
Intrinsic Value Per Share	237.41	
Close Price £	37.00	
VR (low - high)	**231.48**	**243.35**
VR Spread	5.00%	
Implied VR Return (low - high)	525.6%	557.7%

Note: Close price on front page of this ACF research note is based on shares in issue (NoSh) after the closing of the crowd cube GBP 650k raise on 30/12/2104 of 1,764,460 at £0.10 par value. Whereas the ACF valuation is based upon shares in issue at date of this note (NoSh 1,816,970) and the fully diluted metrics are based upon our estimate of likely shares in issue post the current raise programme.

Sensitivity Analysis

Organic growth valuation only - no M&A.

Our applied growth rates during 2017E and 18E are driven by organic growth. 2020E onwards we have for the purpose of the valuation in this research note assumed only organic growth and nil acquisition growth. In addition our 5 year forecast horizon assumes that only Heartcel™ contributes to revenues and FCF.

The exhibit below shows 17E and 18E. Multiples are based upon the EV (enterprise value) from the price at which shares were sold during the GBP 650k crowd funding, which closed on 30/12/14 at GBP 37. The FCF positive inflexion FY18E is dramatic.

Exhibit 1: **Multiples based on CTL placement closing price 30/12/2014**

ACF est. GBP (k)	Revenue	EBITDA	FCF	EPS	EPS (diluted)	CPS	CPS (diluted)
2017E	66,038	30,214	-971	138.5	126.8	-5.34	-4.9
2018E	461,927	220,514	122,276	1,054	965	673	616

Multiples	EV/ Revenue	EV/ EBITDA	EV/ FCF	P/ EPS	P/ EPS (diluted)	P/ CPS	P/ CPS (diluted)
2017E	1.02x	2.23x	-69.49x	0.27x	0.29x	-6.92x	-7.56x
2018E	0.15x	0.31x	0.55x	0.04x	0.04x	0.05x	0.06x

Source: ACF Research Estimates

Exhibit 2: **WACC/Multiple table shows longer-term valuation potential**

Terminal EBITDA Multiple	Share Price WACC 25.00%	35.00%	45.00%	**55.00%**	65.00%	75.00%
1.0x	238.59	181.70	143.62	117.37	98.82	85.42
2.0x	282.29	225.41	187.33	161.08	142.52	129.13
3.0x	326.00	269.12	231.03	**204.78**	**186.23**	172.84
4.0x	369.71	312.82	274.74	**248.49**	**229.94**	216.54
5.0x	413.41	356.53	318.45	**292.20**	**273.64**	260.25
6.0x	457.12	400.24	362.15	335.90	317.35	303.95
7.0x	500.83	443.94	405.86	379.61	361.06	347.66

Source: ACF Research Estimates

No debt funding envisaged – just equity.

The exhibit above indicates the valuation applicable to the current number of shares (1,816,970 before dilution) using an EBITDA TV discounted at 56.38%. **Note** that a Terminal Value multiple of 6x unlevered FCF with a risk adjusted 5-year WACC of 56.38% and FCF TV contribution of 70%, or GBP 302m is, counter intuitively, conservative given the Company currently has nil revenues (it is often reasonable to argue that R&D biotechs rather like E&P miners and oil & gas companies retain all their value in the TV). Our pre new money valuation suggests a CTL value range per share of GBP 231.48 to 243.35 and an intrinsic Enterprise Value of GBP 431.6m.

Of CTL's potential four medicines in clinical trial only Heartcel™ is in our numbers.

As we have only included the potential contribution of Heartcel™ in our forecasts it is possible to envisage substantive potential valuation upticks from the contribution of the next three pipeline medicines, Myocardion™, Tendoncel™ and Skincel™.

Aggressively discounted uFCFs and TVs.

In addition our WACC can be broken down into our Ke of 16.38%, which is unlikely to change dramatically in the short run and a 40% additional risk adjustment based upon the probability of Heartcel™ coming to market. Management estimates a 70% probability of Heartcel™ gaining its US and European licenses.

We use low ball assumptions on growth and margins (valuation assumes catalysts come good).

We apply a lower probability of success in the name of valuation prudence and this is reflected in our 40% risk adjustment, but if CTL were to hit any of its milestones as per the investment case on page 2, and also below, then the risk adjustment could arguably be wound back down as each catalyst is hit.

Catalysts: Heartcel™ and Myocardion launches; Positive Tendoncel™ PII trial results; Raising GBP 40m; listing on a market such as London's AiM; a secondary listing on US technology market Nasdaq; FCF positive FY18E.

uFCF and EBITDA TVs point to similar value range.

Our EBITDA TV multiples and WACC table above lends support to our FCF TV valuation. Interested parties should also note that although we have presented forecasts for FY15E, the company's year end is 31st July. As such these FY15E forecasts are not included in our valuation horizon as they are now past cash flows rather than future ones on the basis that the proportion of first period cash flows contributing to a valuation are an output of the function *((year length -days passed)/year length) x FCF*.

Peers support our valuation range.

Finally we compared our valuation assessment for CTL driven by our conservative forecasts for Heartcel™ to a small listed peer group. We assumed that Heartcel™ hits its milestones and that it is the only medicine in the NYHA IV severe HF patient market at launch, but does not achieve orphan status and eventually faces four competitors. Celyad is an indirect competitor to CTL's Heartcel™. We also selected Mesoblast, an indirect competitor to CTL's Myocardion™, as both medicines target the NYHA II and III patient segments. Neither peer is yet profitable at any line.

Exhibit 1: **CTL peers and AstraZeneca comparator**

AZN provides a valuation multiples reference point rather than peer such as Mesoblast or Celyan.

Comparator	CTL	Mesoblast	Celyad	AZN
MCap GBP	Implied 431.37m	618.97m	350.12m	54,926.54m
15A Price/Sales	N/A (17E 6.53x)	50.20x	3,501x	3.24x

Source: Factset; ACF Estimates; FX rates Mesoblast GBP/AUD 0.4734; Celyad GBP/EUR 0.6971. MCaps previous close.

Financial Analysis

We assume 2nd best in class, no Orphan status achieved, 4 competitors…our forecasting approach is an aggressively down beat take.

● **Competitive advantage** – CTL aims to be 1st or 2nd to market; best in class; with no more than four competitors. The Company also assumes that it will win orphan (unmet need) status and that a compassionate use programme will be in place sometime between 2016 and 17. If achieved we expect to raise our CTL valuation proportionately and this could lead to very significant revaluation within the next 6 to 18 months.

Exhibit 1: **Comparative efficacy between CTL and nearest competitors**

	Off the Shelf Drug Allogeneic			Laboratory Processes (Autologous)					
Company	CTL implied Mcap £431	Mesoblast MCap £618m	Stempeucel	Neostem	Celyad (Cardio 3) MCap £350m	*GHI Berlin	Pharmacell	BioHart	Vericel
Phase of Trial	PII	PII	PI/II	PII	PII/III	PII/III	PII/III	PII/III	PII
MACE-Free Survival After a Year (1)	YES	YES		NO	NO				
Mean LVEF Improvement(2)	30%	NO	NO	N/A(4)	Unknown 5.5% (5)	NO	4%	NO	NO
Scar Size Reduction	40%					2%			
Quality of Life Improvement	50%	NO			NO	NO		NO	YES
Imaging Evidence	YES								

(1) MACE is major adverse cardiac event
(2) LVEF is left ventricular ejection fraction
(3) Market capitalisation as at 22 July 2015 converted to GBP using AUD & EUR spot rates
(4) Reported as statistically significant but mean improvement not reported
(5) Mean absolute improvement c.5.5% (vs. CTL 11.8%) but mean baseline not reported
* German Heart Institute

NO Failed endpoint
2% Statisticlly but not clinically significant
YES Statisticly (P<0.05) and clinically significant

Source: Company reports; ACF Research Estimates; FX rate GBP/AUD 0.4745 Mesoblast and EUR/GBP 0.6989 Celyad

● **Addressable markets** – The clinical pipeline addresses three very different markets. **Heartcel™** is focused on the 300K severely ill coronary congenital abnormalities patients that require open heart surgery each year.

Myocardion™ is focused on the more moderate heart failure patients that undergo minimally invasive catheter operations, i.e. Percutaneous Coronary Intervention, or PCI.

Tendoncel™ is focused on treating patients with severe tendon injuries where a topical medicine is appropriate (i.e. shoulder, elbow and Achilles injuries). **Skincel™** is in PII for reduction of wrinkles and possible diabetic wound healing.

The addressable markets for each CTL medicine are set out as follows:

Exhibit 1: **Addressable Markets**

Product	Addressable Market
Heartcel™	300k severe coronary congenital abnormalities undergoing CABG p.a. at risk of IR
Myocardion	1.3m mild/moderate HF patients undergoing PCI p.a. at risk of IR
Tendoncel™	1.5m severe shoulder, elbow and Achilles tendon injuries requiring surgery p.a.
Skincel™	>2m patients with diabetic ulcers; 13.4m minimally invasive cosmetic procedures p.a.

Source: Company reports; ACF Equity Research.

Significant addressable markets that likely will only be driven higher by developed world demography…an insurer, health service and governmental nightmare.

- **Probabilities of Success** – CTL management is assuming that Heartcel™ has a high probability of success (PoS), of ~70% as is consistent with a Phase III/registration asset.

The follow on product, Myocardion, is seen as having a 30% PoS, as it is entering phase II/III now.

Tendoncel™ is now phase III-ready and so is seen as having a 50% PoS. Skincel™ is still in phase II and is likely to have a 30% PoS.

- **Early stage pipeline** – The pre-clinical pipeline includes an allogeneic immuno-oncology cell medicine, and stem cell medicines for Type I diabetes, and Liver Fibrosis. There are an additional 12 tissue specific cells that have been discovered and are ready to enter pre-clinical.

- **Revenue growth and mix assumptions** – CTL's primary initial revenue generator is Heartcel™ with a launch date of 3Q16E; management sees the market opportunity as a medicine for CABG (see glossary) surgery patients with incomplete re-vascularisation. Heartcel™ is an off the shelf, one hit medicine administered during surgery, taking 5 to 10 minutes to complete the procedure.

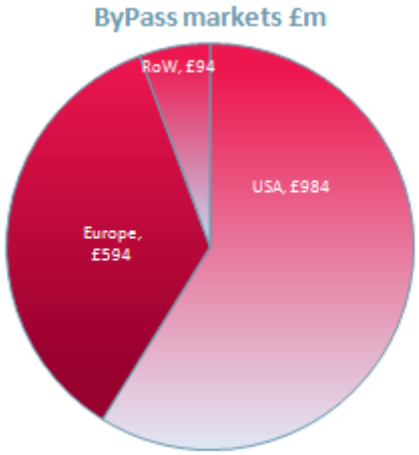
Huge potential savings for medical insurers and healthcare providers compared to current p.a. costs for severely ill patients.

CTL estimates the addressable market is 294k patients p.a.. This CTL assumption is based upon a market of 20m heart disease patients and 800k CABG surgeries per annum. Of these 800k CABG surgeries, 37% show incomplete vascularisation – Heartcel™'s market. CTL assumes that the value per revenue unit (medicine) is GBP 12,500 and upwards across all markets. Comparator solutions e.g. biventricular / cardioverter defibrillators procedures are estimated by KPMG to cost upward of GBP 30k. The devices themselves cost between GBP 12-20k. We expect the next revenue line to be Myocardion™ launching 18E. Tendoncel™ (stem cells to treat tennis elbow and tendonitis) about to complete its PII trials, and possibly partnered soon – launching 19E.

Skincel™ is also expected to come to market perhaps as soon as 2019.

A taste of the potential Heartcel™ market.

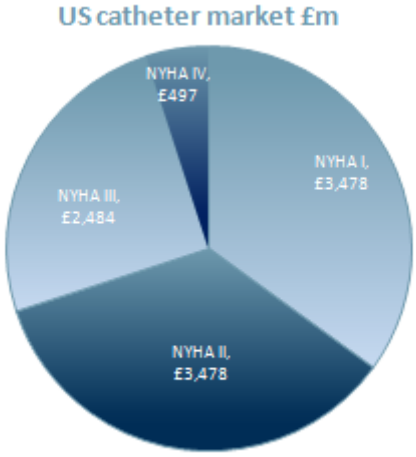
Exhibit 1: **CTL Heartcel™ 15E by value vs. CTL peak market share**



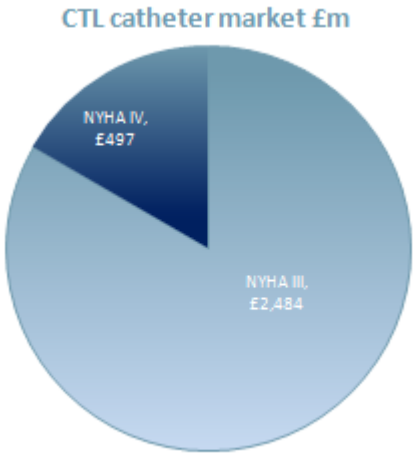
We forecast the FY15E value of CTL's Heartcel™ potential market and overlaid our expectations for Heartcel™'s peak market share to establish an indicative value of Heartcel™'s market share in GBP. As populations age in the developed world we expect the future value of the FY15E market only to increase.

Source: KPMG; Company Reports; ACF Estimates

Exhibit 2: **CTL US Myocardion 15E market value vs. CTL peak share**



Source: KPMG; Company Reports; ACF Estimates



Source: KPMG; Company Reports; ACF Estimates

CTL estimates that it can achieve 37% market share on the assumption that it is 2nd to market but with the best solution. KPMG estimates that CTL could achieve 30% market share based on 2nd to market and four competitors. We take a more conservative view and assume that CTL's Heartcel™ does not achieve orphan status, is the second best medicine, with at least four competing credible procedures. As a result our revenue growth estimates are anywhere between 5% and 40% lower over our 5-year forecast horizon compared to CTL's low case internal revenue estimates.

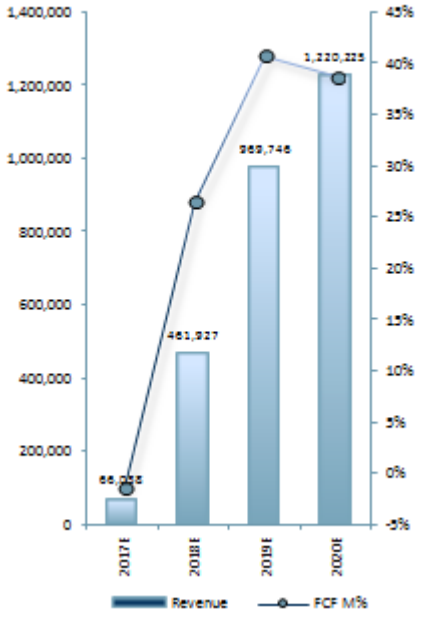
We have not included **Tendoncel™** revenues in our valuation model and a licensing deal could potentially provide upside to our current valuation. We note that the average

up front payment for phase II licensing deals in 2013 was USD 131m with total deal value including milestones and royalties of USD 643m, according to CTL. Full phase II results at three months post treatment are expected in August 2015.

Financial mechanics look right.

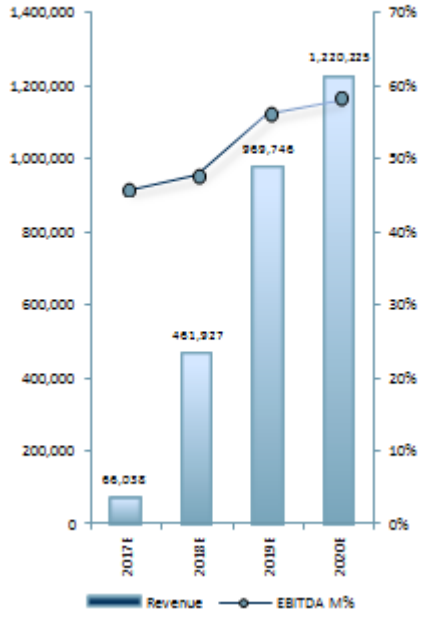
● **EBITDA growth** – We forecast a positive EBITDA margin from 2017E through to 2020E at which point we expect EBITDA margins, broadly, to stabilise. Our EBITDA margin FY17E is 45.75% rising to FY20E 58.23%, effectively 12.5 percentage points over 4 years. This is well within our rational expectation for a business with high revenue growth potential and a dramatic inflection point FY18E FCF. Although Opex rises dramatically over the period, revenues rise faster. We forecast FY17E SGA at approximately 40% of revenues falling to around 25% of revenues by FY20E.

Exhibit 3: **Rev (m) /FCF**



Source: ACF Estimates

Exhibit 4: **Rev (m) /EBITDA**



Source: ACF Estimates

Senior executives invested.

● **Cash balance** – CTL has raised GBP 650k during the 2015 financial period in a highly successful private placement. In addition newly joining executives have also invested in the company. CTL expects to raise a further GBP 40m in new equity. We estimate cash balances of around GBP 500k at the date of this note.

Our favourite fixed asset – CTL's high end scanning electron microscope. We viewed it in action for both research and showing potential stakeholders (investors et al) CTL's work in terms of finding stem cells

● **D&A** – Fixed assets, YE 31 July 2014 GBP 22.439k, are composed largely of laboratory and office equipment. The most significant fixed asset is the Company's high quality scanning electron microscope. Intangible assets FY14A GBP 98.609k consist of cost for patents and will inevitably be amortised over the patent term grant date, as would be expected.

No interest bearing debt.

We exclude interest receivable from our uFCF forecasts.

● **Interest paid/received** – CTL has been interest-bearing debt free since close of FY13A and we are not expecting the company to use debt as a funding source in the foreseeable future, as such our forecasts do not include any provision for interest payments and so there is no taxable income deductions for Interest costs in our model. However we do infer a contribution to Interest receivable from funds raised (GBP 40m) during 2015 and 16E.

As CTL is not a financial services company, Interest receivable (Ir) does not contribute to our operational uFCF forecasts used in our DCF valuation.

● **Effective Tax Rate (ETR) on EBT** – Based upon our discussion with the management team we expect CTL's ETR to average 10% over the next 5 years. The precise figures are moderated by the tax patent box assumptions and in some years exceed 10% and others are less than 10% of EBT.

Capex 25% headroom.

● **Capex (Capital Expenditure)** – Our capex assumptions, based upon management discussions, convey 25% headroom over and above the required investment in the EU and US, based on a smooth progression. In other words we have forecast a capex requirement that is 25% more than that required if there were no obstacles to Heartcel™ PIII trials and successful efficient execution of the marketing strategy.

We assess that this provides the company with reasonable headroom to cover unforeseen or undesired eventualities. In our assumptions we have allocated an average growth capex budget of GBP 2-5m per manufacturing facility. We assume two manufacturing plants are built in Europe, four in the US and four in the RoW regions. This assumption is based upon an airfreight time of 4-6 hours maximum for the stem cells to be delivered to a surgical unit for the CTL medicine to be employed.

4-6 hour window should give cardiac centres high degree of comfort.

The capex strategy is therefore driven by 4-6 hour flight windows. This model requires four manufacturing facilities in the US to service the East and West coasts and the Midwest and Southern Florida. Because of regional demographics, Florida is a significant part of the entire US market by value. CTL believes that a 12-hour window is sufficient to airfreight, defrost, and test CTL's stem cells for viability and so to provide an acceptable service to cardiac centres. CTL plans to provide a 4-6 hour window, which should give cardiac centres a high degree of comfort.

● **Retention of key employees** – the company is dependent on a small group of highly skilled staff, as is true of most small healthcare companies. The premature departure of key staff could have significant impacts on our forecasts and valuation of the CTL business. CTL has key man insurance of over GBP 1m and incentives to retain these business critical team members, according to its November 2014 private placing memorandum (PPM). Management recently confirmed that subsequent to the November 2014 PPM an LTIP scheme is now in place.

● **Dilution and Options** – Post the highly successful and very efficient 650k private placement in the crowd funding market the company has 1,816,970 shares in issue. We infer that the company will issue 168,349 further new shares during 3Q15 based on our implied intrinsic price in our valuation. These shares will be issued in order to raise equity for its required PIII trials and direct marketing budget. There is currently an LTIP in place and we expect further dilution potential from such packages and key personnel incentives schemes in due course.

No M&A in foreseeable future.

● **Acquisitions** – We are not currently expecting CTL to engage in future acquisitions and our forecasts include only organic growth assumptions relating to the medicine closest to coming to market, Heartcel™, with a single indication.

Expected free float at least 10%.

● **Free float** – The company intends to list on AiM or a similar market and to dual list on Nasdaq subsequent to a successful IPO. We expect the company to have a theoretical "free float" of 9.27% based upon our valuation. CTL expects the actual formal free float to be at least 10% and we assess that this is a likely outcome. In reality the Company's shares are likely to be fairly (to very closely) held and not particularly liquid. The free float may in practice be close to zero.

● **Future funding requirements** – We estimate that the company's future funding requirements in order to bring Heartcel™ to a position where the company can begin to market the medicine directly to leading cardiac centres in Europe during 1H17 requires GBP 10m and that CTL's current strategy, which includes the US, requires a total GBP 40m raise in this round.

Use of Funds – GBP 40m

- Launch of Heartcel™ in Europe and the US (possibly as early as 3Q16) and push towards profitability;
- Funding PIII trials for Heartcel™ stem cell medicine to treat heart failure (HF);
- Development of Myocardion™ (heart failure treatment administered by catheter that targets a larger addressable market than Heartcel™;
- Listing costs on primary market GBP 3m.

Exhibit 5: **CTL use of funds**

Item	Amount (GBP)
Launch of Heartcel™	17m
Funding PIII Heartcel™ trials	8m
Myocardion™ development	12m
Listing costs (AiM)	3m

Source: Company Reports; ACF Estimates

Financial Projections

Exhibit 1: **CTL P&L and forecasts**

P&L GBP (k)	2014A	2015E	2016E	2017E	2018E
Revs	**1,163**	**0**	**0**	**66,038**	**461,927**
gr%	637%	N/A	N/A	N/A	599%
GP	1,163	0	0	56,391	383,012
% Revs	N/A	N/A	N/A	85%	83%
SGA	780	1,134	16,381	26,177	162,498
% Revs	N/A	N/A	N/A	40%	35%
EBITDA	**383**	**-1,134**	**-16,380**	**30,214**	**220,514**
% Revs	N/A	N/A	N/A	46%	48%
D&A	-3	-7	-388	-2,250	-7,676
% Revs	N/A	N/A	N/A	-3%	-2%
EBIT	**386**	**-1,141**	**-16,768**	**27,964**	**212,838**
EBT	386	-1,141	-16,768	27,964	212,838
ETR	N/A	N/A	N/A	10%	10%
Tax				2,796	21,284
NI	**386**	**-1,141**	**-16,768**	**25,168**	**191,554**
% Revs	N/A	N/A	N/A	38%	41%

Source: Company reports; ACF Estimates.

Exhibit 2: **CTL Balance Sheet and forecasts**

Balance Sheet GBP (k)	2014A	2015E	2016E	2017E	2018E
Tangible Assets	22	21	12,225	19,750	21,163
Intangible Assets	99	217	2,081	4,231	5,769
Total Fixed Assets	121	238	14,306	23,980	26,932
Current assets	150	62	122	27,003	259,194
Cash	53	735	10,970	10,000	132,275
Total Current Assets	203	797	11,093	37,003	391,469
Creditors	115	70	1,147	11,631	177,495
Accruals & Loans	129	12	68		
Net Assets	80	953	24,184	49,352	240,906
Share Capital	16.96	18.17	19.85	19.85	19.85
Reserves					
Share Premium	379	2,392	42,390	42,390	42,390
Accum. Profit/(loss)	-316	-1,457	-18,225	6,942	198,497
Total Equity	80	953	24,184	49,352	240,906

Source: Company reports; ACF Estimates.

Exhibit 1: **CTL Cash Flow Statement and forecasts**

Cash Flow GBP (k)	2014A	2015E	2016E	2017E	2018E
CFO					
Profit/(loss) for period	383	-1,141	-16,768	27,964	212,838
Depreciation	3	7	388	2,250	7,676
Δ Working capital	-1,058	-16	927	-17,490	-67,654
Net CFO	-672	-1,150	-15,453	12,724	152,860
Cash Taxes				2,796	21,284
Capex	54	123	14,416	10,898	9,300
FCF	-726	-1,274	-29,869	-971	122,276
CF from Financing		2,061	40,000		
Net Cash In/(Out)	-726	787	10,131	-971	122,276
Cash previous YE	779	53	840	10,970	10,000
Cash & CE	53	840	10,970	10,000	132,275

Source: Company reports; ACF Estimates.

Glossary

Allogeneic mesenchymal stem cells	Allogeneic cells are those given to a patient from a separate non-identical genetic donor of the same species. Most human transplants are allogeneic and not to be confused with xenogenic, which would imply a transplant from a different species.
Ambulatory Heart Failure	Patients with heart failure that retain mobility.
Angioplasty	Angioplasty is a medical procedure used to widen narrowed or obstructed arteries or veins. A stent can or may also be inserted after the artery or vein is opened to keep it opened. Angioplasty is most commonly associated with treatments for atheroslcerosis.
Asymptomatic	Aysmptomatic suggests there are no symptoms i.e. the patient may have the disease or be cured but in either event the patient does not exhibit any symptoms of the condition.
Autologous	Derived or transferred from the same individual's body e.g. Mesoblast's autologous bone marrow transplant therapy.
BCG Value Capture Matrix	Boston Consulting Group's BCG value capture matrix for forecasting likely market share is a corporate planning tool to help managers understand which products and markets to focus on/invest in based upon product competitiveness and market opportunity/attractiveness.
CABG	Coronary Artery Bypass Graft [CABG pronounced cabbage] – commonly referred to as heart bypass surgery, which is a surgical procedure to relieve angina and cut the risk of death from coronary artery disease. Arteries and veins from other parts of the body are grafted to the coronary arteries to bypass atherosclerotic narrowings and improve blood supply to the myocardium (heart muscle).
Cardiomyopathy	Cardiomyopathy is the deterioration in the ability of the myocardium (heart muscle) to contract.
CD	Cluster of differentiation (CD). For example CD99, which is an antigen transmembrane protein coded for by gene CD99 in humans and is also part of the immune response waterfall. CD99 is also known as MIC2 or single-chain type-1

	glycoprotein. CD99 has a mass of 32kD and is expressed in immune system cells including all leukocytes. CD99 is highest on thymoctyes and is thought to augment T-cell adhesion.
CMS	Contract Manufacturing Solutions (CMS).
CoS	Cost of Sales is, in ACF's financial models, a variable cost linked directly to revenue development, e.g. sales team commissions, but for example, not sales team salaries.
CXCR1-CXCR7	CXC chemokine receptors are integral membrane proteins that bind specifically and respond to cytokines of a large sub-group of the CXC chemokine family. The subgroup is the family of G protein-linked receptors known as seven membrane (7-TM) proteins as they span the cell membrane 7 times. In mammals there are currently 7 known CXC chemokine receptors – CXCR1 through CXCR7. The CXCR1 and 2 chemokine receptors are closely related and bind to interleukin 8 and are both expressed on the surface of neutrophils in mammals.
EAT	Earnings after tax. Also often expressed as PAT – profit after tax, and post tax profit.
EBIT	Earnings before interest and tax (also often referred to or equates to operating profit).
EBITDA	Earnings before interest, depreciation and amortisation – the presentation of EBITDA by companies is not a requirement of UK GAAP or IFRS accounting standards. However in certain cases it can act as a close proxy to free cash flow.
EBT	Earnings before tax. Also often expressed as PBT – profit before tax.
EGF-R	Epidermal growth factor receptor (EGF-R) essentially stimulates protein signalling further downstream. EGF-R is the cell surface receptor for the EGF family of extracellular protein ligands. Mutations affecting EGF-R expression or activity could result in cancer. The Epidermal growth factor receptor (EGF-R) sits on the cell surface and is activated by specific ligands including epidermal growth factor (EFG). Once the receptor is bound it changes from a monomeric inactive form to an active homodimer. Dimerization of EFG-R stimulates intracellular protein-tyrosine kinase activity, which down the waterfall leads to, amongst other things, DNA

	synthesis.
FACS	Fluorescence-activated cell sorting (FACS) is a derivative of flow cytometry that permits a researcher to physically sort a heterogeneous mixture of cells into different populations. It achieves this by using highly specific antibodies tagged with fluourescent dyes. A sample can be sorted by an almost unlimited number of different parameters using FACS.
FCF	Free Cash Flow generated in ACF's models after all obligatory cash costs have been satisfied such as Interest payable (Ip), cash taxes and maintenance capex (as opposed to investment capex). FCF represents the cash remaining for theoretical distribution or investment after all obligatory cash based costs including net interest payable have been deducted.
FDA	Food and Drug Administration. The US federal agency that regulates foods and drugs amongst a long list of other items. It gives approval (or not) for the marketing of drugs in the US market.
GVHD	Graft Versus Host Disease (GVDH) – a possible immune response complication after bone marrow or stem cell transplants from another person to the patient. GVHD is caused when T-Cells (a type of white blood cells) in the donated bone marrow or stem cells attack the recipients own body cells.
HCSCs	Autologous (see glossary) human cardiac-derived stem cells (transplantation by Japan institute).
HF	Heart Failure is a condition that usually occurs because the heart muscle becomes weak or less flexible and ceases to work properly. The conditions means the heart requires support (rather than it stops working). The three main types of HF are LVSD, HFPEF and damaged or diseased heart valves. The common causes are high blood pressure, CHD cardiomyopathy, atrial fibrillation and heart valve disease or damage.
HFPEF	Heart Failure with Preserved Ejection Fraction – often a result of the left ventricle losing its flexibility, which impairs the ability of the heart chamber to fill with blood.
Hypophosphatasia	HPP is a rare metabolic bone disease that effectively leads to impairments in bone mineralization. It can be fatal and

(HPP)	symptoms can include respiratory compromise.
ICD (Biventricular)	ICD – Implantable Cardioverter Defibrillator. A biventricular ICD is used to control rapid heart beat (arrhythmia) by shocking it back to a normal rate. This ICD is used for patients with left ventricle Heart Failure (HF).
IDE	IDE is the investigational device exemption programme run by the US regulator the Food and Drug Administrator (FDA).
iMP	Immunomodulatory progenitor cells (iMPs) – are novel and distinct mesodermal progenitor cells isolated by Cell Therapy Ltd and selected on their regenerative characteristics, unique homing capabilities and immunomodulatory capability. iMPs are MSC-like and plastic adherent but they are not MSCs (see glossary) according to the ISSCR (see glossary).
IR	Incomplete re-vascularization.
Ischemic cardiomyopathy	Ischemic cardiomyopathy is characterized by severely impaired left ventricular function. The heart can no longer pump enough blood to the rest of the body due to coronary artery disease. Patients often suffer Heart Failure (HF).
ISSCR	International Society for Stem Cell Research (ISSCR) is an independent non-profit for the voice of the stem cell research community. Founded in 2002 for the exchange of information on stem cell research, it claims 4,100 members globally and has an ISSCR Annual Meeting for the dissemination of groundbreaking stem cell research science.
LVEF	Left Ventricle Ejection Fraction (LVEF) is the volume or fraction of blood pumped from the heart by each heartbeat. LVEF is used as a measure of cardiac function. The value is typically lower in patients with congestive heart failure. LVEF is a determinant for the severity of coronary artery disease, congenital heart disease and systolic heart failure amongst others. The LVEF value is determined using echocardiography.
LVSD	Left Ventricular Systolic Dysfunction – the left ventricle, which pumps heart around the body, becomes weak. LVSD is the most common cause of heart failure (HF) accounting for around 60% of cases. Systolic heart failure is caused by a fall in heart contractility. (Diastolic heart failure is due to impaired cardiac relaxation and abnormal ventricular filling).

MACE	Major Adverse Cardiac Event
Mesenchymal stem cells (MSCs)	MSCs are multipotent (as opposed to pluripotent) stem cells (also known as stromal stem cells) that can differentiate into a limited range of other cells including muscle cell, osteocytes (bone), chondrocyte, stromal cell (connective tissue) and fibroblast. MSCs are not derived from bone marrow but from tissues such as umbilical chord tissue (Wharton's jelly) and umbilical chord blood.
MLHF	Minnesota Living with Heart Failure questionnaire (MLHF) is a patient self-assessment questionnaire of how Heart Failure affects his or her daily life. The survey attempts to establish the way a heart failure treatment can affect quality of life by examining emotional, social and mental dimensions of quality of life.
MPC	Mesenchymal Precursor Cell.
Myocardial infarction	A heart attack – blood stops flowing properly to the heart damaging the heart muscles because they do not receive sufficient oxygen. This happens because of an unstable build up of white blood cells, cholesterol and fat.
Myocardial ischemia	Decrease in blood flow through one or more blood vessels that lead to the heart. May occur slowly or suddenly. It is caused by coronary artery disease.
NI	Net Income, last profit line in the P&L. Also referred to as net profit.
NICE	National Institute for Health and Care Excellence. NICE is responsible for approving expenditure on new drugs and procedures by the National Health Service. NICE is the UK's medical cost effectiveness body
Non-Ischemic Congestive Heart Failure	Non-Ischemic congestive heart failure is not caused by coronary artery disease but instead associated with disease states in other organs. In congestive heart failure the heart wall becomes thinner and less strong and so cannot pump blood as effectively and this causes other fluids to back up into the lungs and other organs.
NYHA	New York Heart Association functional classification system for the degree of heart failure in a patient. NYHA has four classifications I-IV, where patients with I have the disease but no symptoms or limitations; II suggests mild shortness of

	breath/angina and slight physical limitations. III comfortable only at rest; IV bedbound generally.
Orphan drug	An Orphan drug is one that is developed specifically to treat a particular condition – the orphan disease. US and UK regulators offer less onerous marketing approvals and other incentives such as longer patent exclusivity for orphan drug applications.
Percutaneous	Percutaneous refers to a surgical procedure where inner organs or other tissue is accessed using a needle-puncture to the skin.
Primary Indication	A primary indication in life sciences is a condition that makes a particular treatment or procedure advisable.
QALY	Quality-Adjusted Life Year (QALY) is a measure of disease "burden". QALY attempts to capture not just an extension to life-expectancy but also the quality of that extended life and as such is used to assess the value for money of a medical intervention. i.e. is the quality of life achieved worthwhile in terms of the extension of life at a given cost. A year of perfect health is scored from a value of 1.0, down to a value of 0.0 for being dead. It is a model to help describe and assess constant proportional tradeoffs.
Reneuron	Reneuron is a UK, AiM listed, biotech play
Secondary Indication	See primary indication.
SGA	Sales, General and Administrative expenses, often equates to or is equivalent to Cost of Sales (CoS) plus operating expenses. However ACF uses SGA to classify relatively invariable expenses as opposed to variable expenses linked more or less directly to revenue generation, as such sales commissions might typically end up in CoS, whereas salaries for sales people would be classed as relatively invariable and be booked under SGA in an ACF model.
Stem cells	Stem cells are undifferentiated cells that can change into specialized cells and via division (mitosis) can make more stem cells. There are two types (broadly) – embryonic stem cells from blastocysts and adult stem cells found in various adult tissues. In adults, stem cells form part of the body's repair mechanism.

Stro-1	Stro-1 is the best known mesenchymal stem cell (MSC) marker, though studies have shown its presence in the endothelium. Stro-1 is a 75kD endothelial antigen.
Stro-3	Stro-3 is a novel monoclonal antibody that binds to tissue non-specific alkaline phosphatase, a cell-surface glycoprotein usually associated with the osteoblast (bone cell) lineage. It may also be a marker for multipotent bone marrow stromal stem cells (BMSSCs).
Stromal stem cells	See Mesenchymal stem cells (MSCs).
TGA	Australian Therapeutic Goods Administration (TGA) – is the regulatory body for therapeutic goods including medicines, medical devices sand gene technology amongst others. It is a department within the Australian Department of Health. TGA was established under the Therapeutic Goods Act '89. It monitors standards of and timely access to therapeutic goods in the Australian market.
uFCF	Unlevered Free Cash Flow is FCF from which cash based interest payments are not deducted. It represents the total maximum cash flow available to both bond and equity holders over a given period.
Up-regulation	Up-regulation is the process by which a cell decreases the quantity of a cellular component, e.g. RNA or a protein in response to an outside variable. An example of down-regulation is the cellular decrease in the number of cellular receptors to a molecule such as a hormone or neurotransmitter.

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