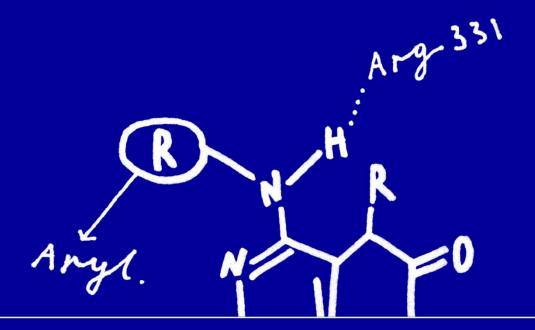


## Shifting the drug discovery paradigm

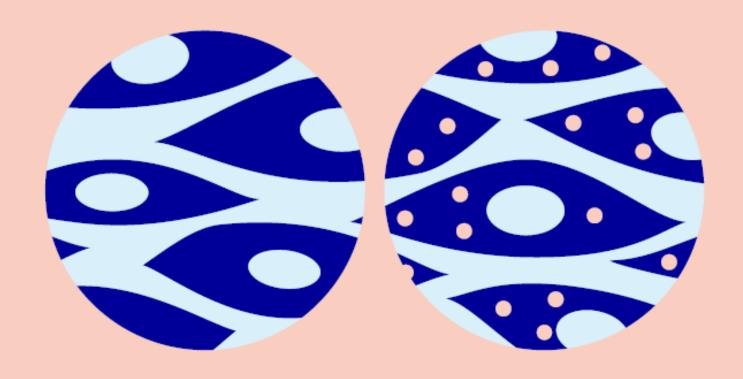
Evotec and Celgene in exclusive drug discovery collaboration for neurodegenerative diseases





### Forward-looking statement

Information set forth in this presentation contains forward-looking statements, which involve a number of risks and uncertainties. The forward-looking statements contained herein represent the judgement of Evotec as of the date of this presentation. Such forward-looking statements are neither promises nor guarantees, but are subject to a variety of risks and uncertainties, many of which are beyond our control, and which could cause actual results to differ materially from those contemplated in these forward-looking statements. We expressly disclaim any obligation or undertaking to release publicly any updates or revisions to any such statements to reflect any change in our expectations or any change in events, conditions or circumstances on which any such statement is based.



### iPS cells – A paradigm shift in drug discovery

Evotec's industrialised iPSC infrastructure represents one of the largest and most sophisticated iPSC platforms in the industry



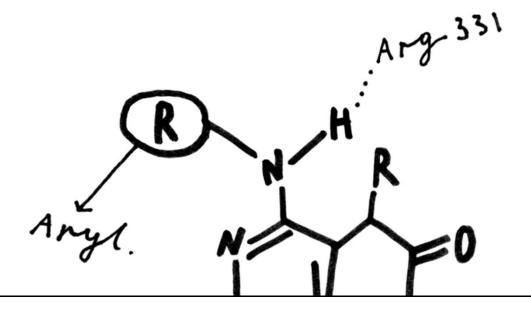
## **Agenda**

### Rationale for next generation drug discovery

Paradigm shift with iPS cells ("iPSC")

Evotec and Celgene: Alliance in neurodegeneration

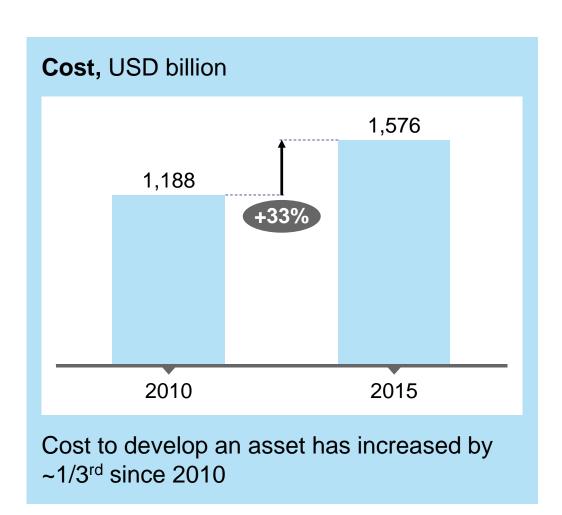
**Next Steps** 

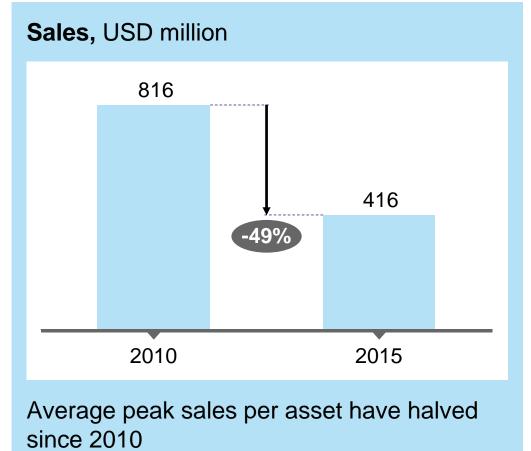




## Improving R&D productivity in the pharmaceutical industry is imperative

Development costs increase while average peak sales decrease

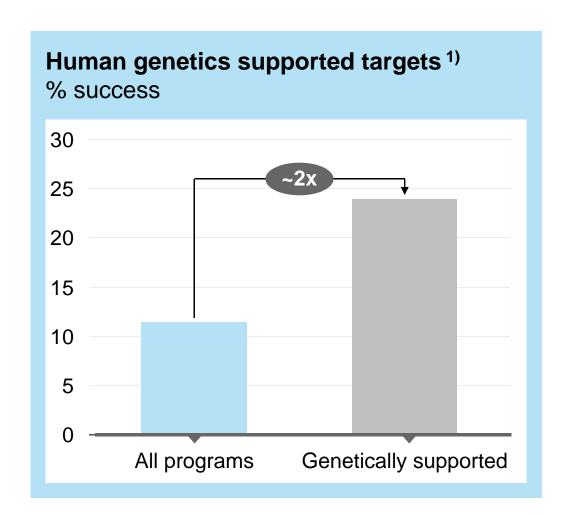


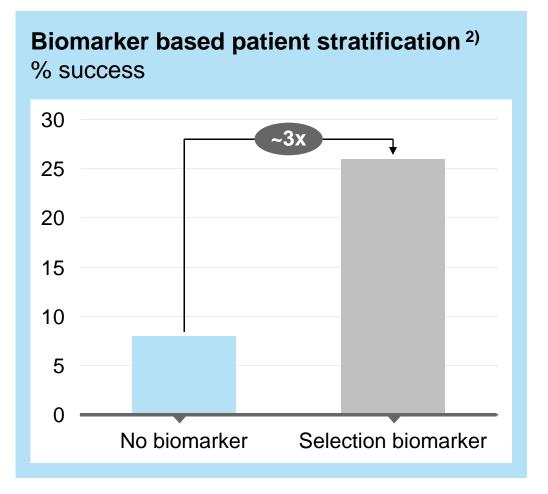




## Patient centric approaches improve success rates

Human genetics and biomarkers are improving the odds of success





<sup>1)</sup> Source: Nelson et. al., Nat. Genet. 2015

<sup>2)</sup> Source: Bio



## Fully integrated iPSC-based drug discovery platform

### The Evotec iPSC accelerator platform

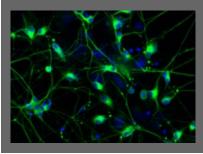
## iPSC culture

- Access to iPSC lines
- Expansion & banking
- Quality control standards
- Scale up



## Patient-derived disease models

- SC-derived disease-relevant cell types
- Optimisation
- Scale up



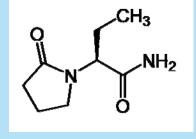
## Hit identification

- High-content screening
- Electrophysiology
- Gene expression profiling



#### H2L/LO

- Cellular assays
- Medicinal chemistry
- Target deconvolution
- In vitro toxicity



## In vivo pharmacology

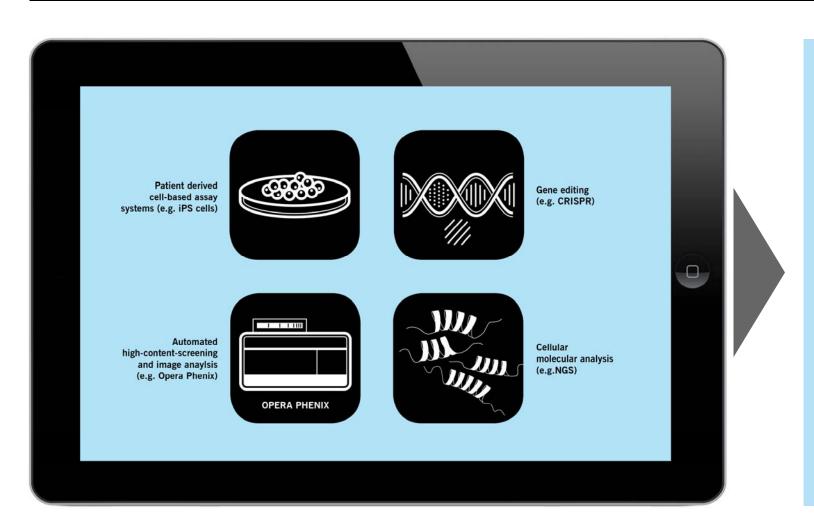
- PK/PD
- Biomarker driven in vivo disease models
- Biomarkers





### Latest stage technologies open new horizons

Combining human genetics with disease relevant read-outs



### Combination of breakthrough technologies enable a new era in drug discovery

- Patient derived cellbased assay systems (e.g. iPSC)
- Gene editing (e.g. CRISPR)
- Cellular molecular analysis (e.g. NGS)
- Automated high-content screening and image analysis (e.g. Opera Phenix)



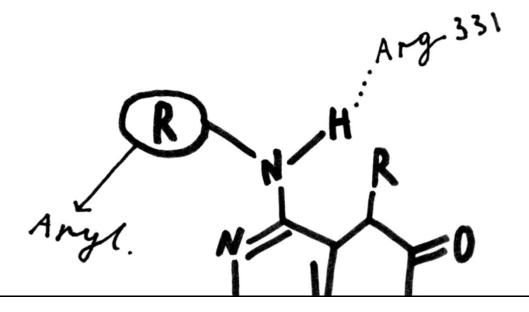
## **Agenda**

Rationale for next generation drug discovery

### Paradigm shift with iPS cells ("iPSC")

Evotec and Celgene: Alliance in neurodegeneration

**Next Steps** 





## Only few moments in science are undisputed as genuine and elegant in creativity and simplicity

Shinya Yamanaka — Discovered iPSC in 2007 — Nobel prize in Medicine 2012

"The induced pluripotent stem cells created by Shinya Yamanaka will allow us to interrogate and understand the full extent and variation of human disease, will enable us to develop new medicines and will forever change the way science and medicine will be conducted for the benefit of mankind."

1)



# iPSC technology shifts the drug discovery paradigm in drug discovery as well as cell-based therapy

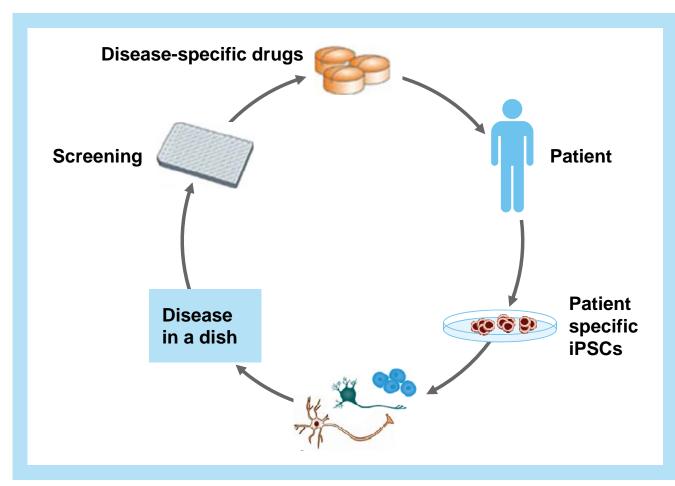
Advantages & hurdles with iPSC

	Drug discovery	Cell therapy
Key advantages	<ul> <li>Focus on human disease relevance already at screening stage         <ul> <li>Replacement of rodent cell &amp; in vivo models</li> </ul> </li> <li>Novel strategy for patient stratification         <ul> <li>In vitro clinical trials / precision medicine</li> </ul> </li> <li>Novel translational biomarkers</li> <li>Excellent basis for more complex in vitro models         <ul> <li>Co-cultures / organoids</li> </ul> </li> </ul>	<ul> <li>Autologous cell therapy can circumvent immune rejection</li> <li>In combination with gene editing technology provides potential cures</li> </ul>
Key challenges	<ul><li>Standardisation</li><li>Industrialisation</li></ul>	<ul><li>Functional integration in tissues</li><li>Regulatory challenges</li></ul>



# iPSC-based drug discovery platform has been established over the last 5 years

Key elements of drug discovery process with iPSC



- High quality iPSC cultures at large scale (QC)
- Industrial processes for generation of patient-derived target cell types
- Robust disease-relevant phenotypic readouts for screening
- Panel of disease area focused patient-derived genotypes for patient stratification strategy









### Focus on human disease relevance from the start

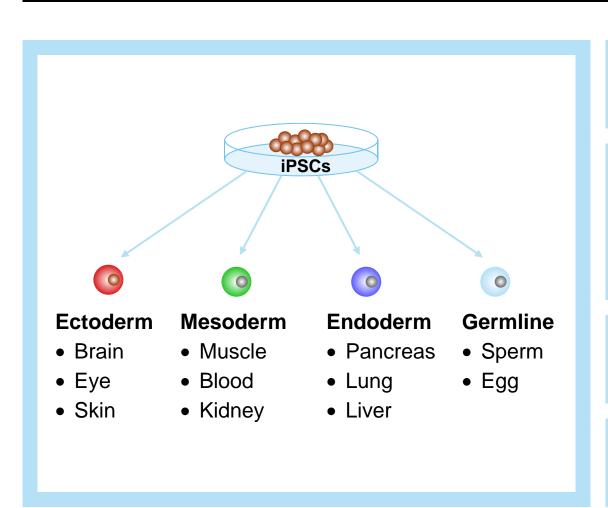
iPSC will shift the drug discovery paradigm

	Disease relevance		Voy Adventere	
	OLD	NEW with iPSC	Key Advantage	
In vitro models for drug screening / profiling	Low	High	Patient-derived disease models for drug screening and profiling confers disease relevance early on	
In vivo models for drug screening / profiling	Low	High	Efficacy testing in animal models focus more on MoA <sup>1)</sup> and PK/PD profiles	
Pre-clinical patient stratification	Not possible	Possible	Early patient stratification enables better focused clinical development	
Success rate in clinical testing even in well defined patient populations	Low	High	With increased success rates, cost for development of and prices for medication will decrease	



## Initial focus on key neuronal cell types

From prototype protocol to industrial process



#### **Motor neurons**

Amyotrophic lateral sclerosis

#### **Cortical neurons**

- Huntington's disease
- Frontotemporal dementia
- Alzheimer's disease

### **Dopaminergic neurons**

Parkinson's disease

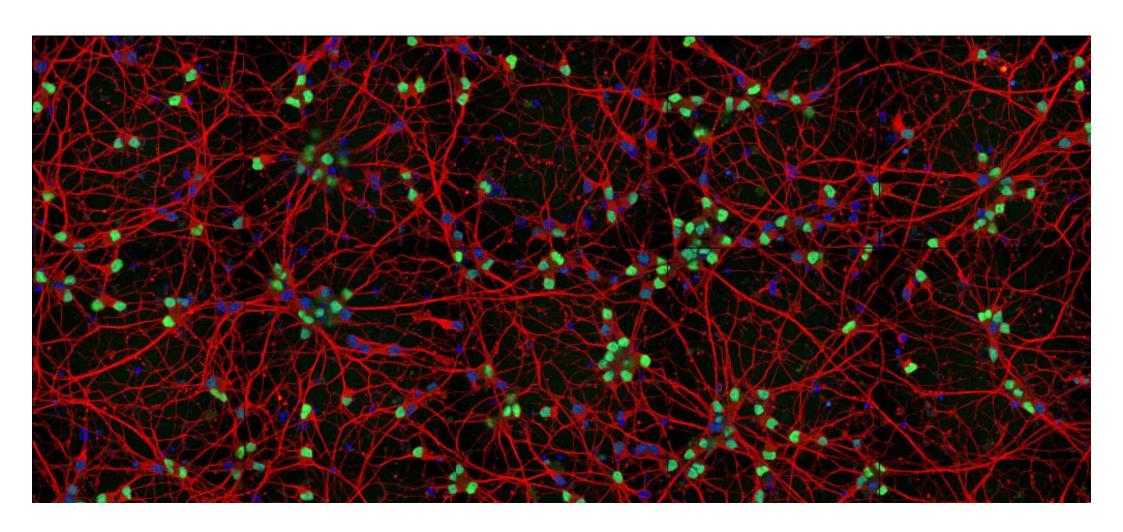
### Microglia

Alzheimer's disease



### Patient derived functional neurons

Manufacturing process adapted to 384-well format suitable for HCS

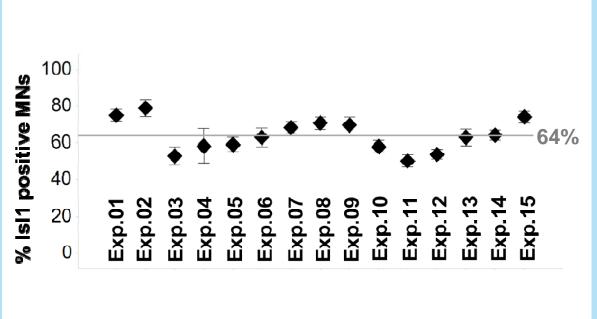


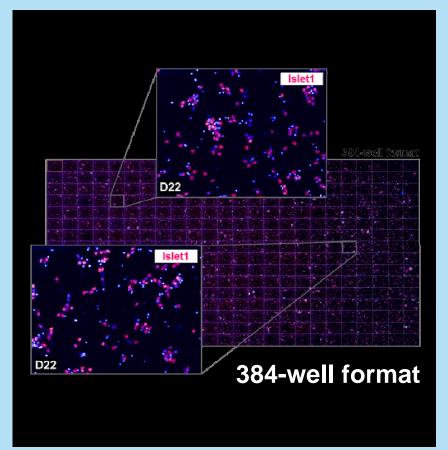


## Industrialised process to generate patient neurons in 384 well format suitable for HCS

Highly robust, semi-automated human neuron manufacturing process

- Low inter / intra plate variability
- Low day-to-day variability

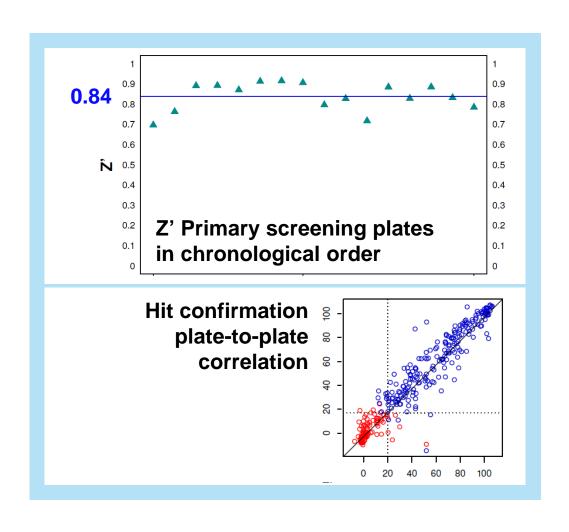


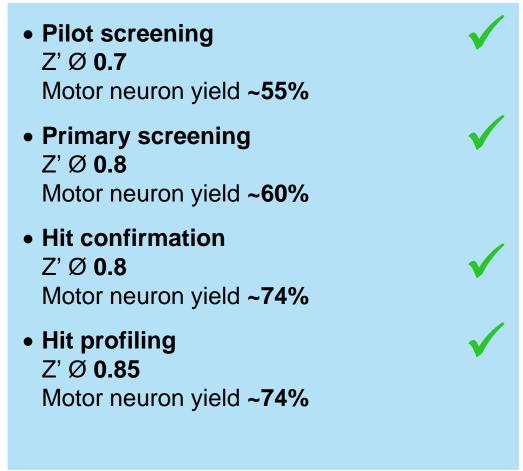




# Unprecedented performance indicators in iPSC-derived human neuron assays

Excellent screening performance indicators throughout screening campaign

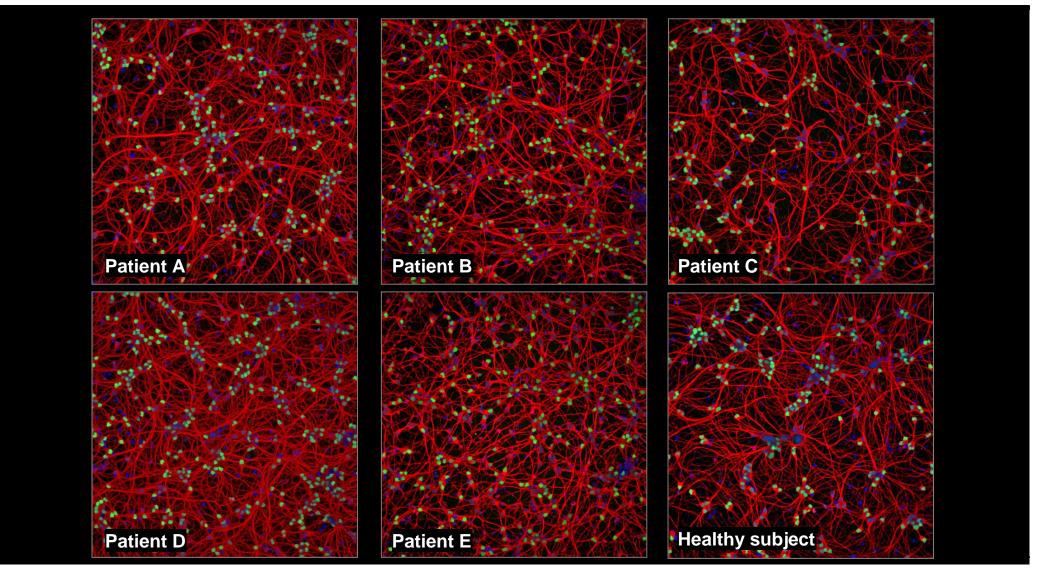






## Highly robust manufacturing process works for all lines tested so far

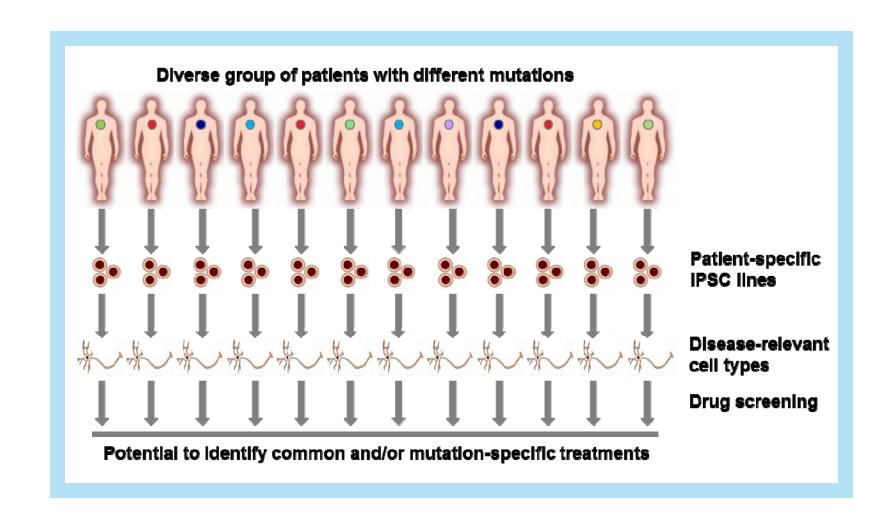
General applicability of human neuron manufacturing process





## Early patient stratification via 'clinical trial in a dish'

Patient-derived iPSC-lines available for multiple genotypes (e.g. ALS)





## Focus on genetically defined subpopulations of widespread diseases

Many opportunities beyond neurodegeneration focus

### **Neurodegenerative diseases**

- Alzheimer's disease
- Parkinson's disease
- Amyotrophic lateral sclerosis
- Huntington disease
- Frontotemporal dementia
- ...
- ,,,

### **Neurodevelopmental diseases**

- Autism related spectrum disorders
- Spinal muscular atrophy
- Bipolar disorders
- Epilepsy

#### Lysosomal storage diseases

- Gaucher, Fabry
- Batten, MLIV<sup>1)</sup>

#### **Myopathies**

- FSHD<sup>2)</sup>
- Duchenne

#### **Diabetes**

- Drug discovery
- Cell therapy

### **Diabetic complications**

- Nephropathy
- Retinopathy

<sup>1)</sup> MLIV = Mucolipidosis Type IV

<sup>&</sup>lt;sup>2)</sup> FSHD = Facioscapulohumeral Muscular Dystrophy



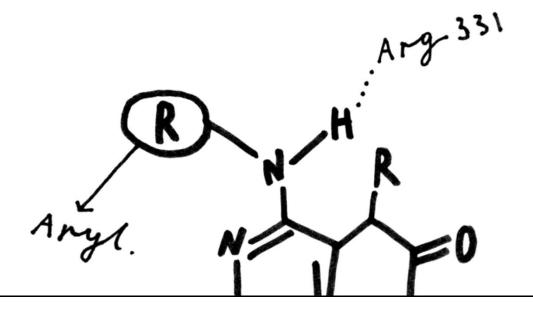
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Rationale for next generation drug discovery

Paradigm shift with iPS cells ("iPSC")

**Evotec and Celgene: Alliance in neurodegeneration** 

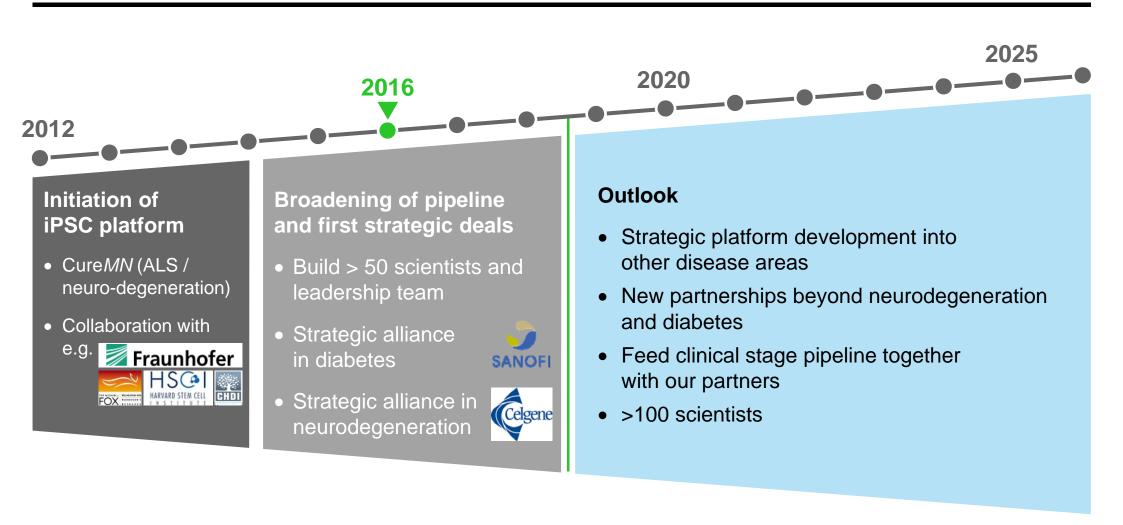
Next Steps





# Clear strategy towards global leadership in iPSC- based drug discovery

From scientific discovery to strategy





# Neurological diseases will remain a serious threat to public health

Societal burden of CNS related diseases is daunting<sup>1)</sup>

#### Why CNS diseases?

Constitute the biggest health care challenge

- Dementia accounted for 46 Mio. patients in 2015
- Cost of care globally exceeded USD >650 billion in 2015<sup>3)</sup>
- No effective treatments for most CNS diseases as of today

# Why neurodegenerative diseases (ND)?

ND cause progressive loss of neurons in the brain

- Genetically inherited or of unknown etiology
- Severe debilitating effects causing ataxia and dementia
- Dementia is expected to account for >131 million patients by 2050<sup>3)</sup>

### Why patient derived ?

iPSC technology is uniquely suited to approach ND

 Patient derived disease models are expected to be more predictive than traditional animal models

- Allow systematic screening and profiling of compounds
- Allow early patient stratification

of care is approx.

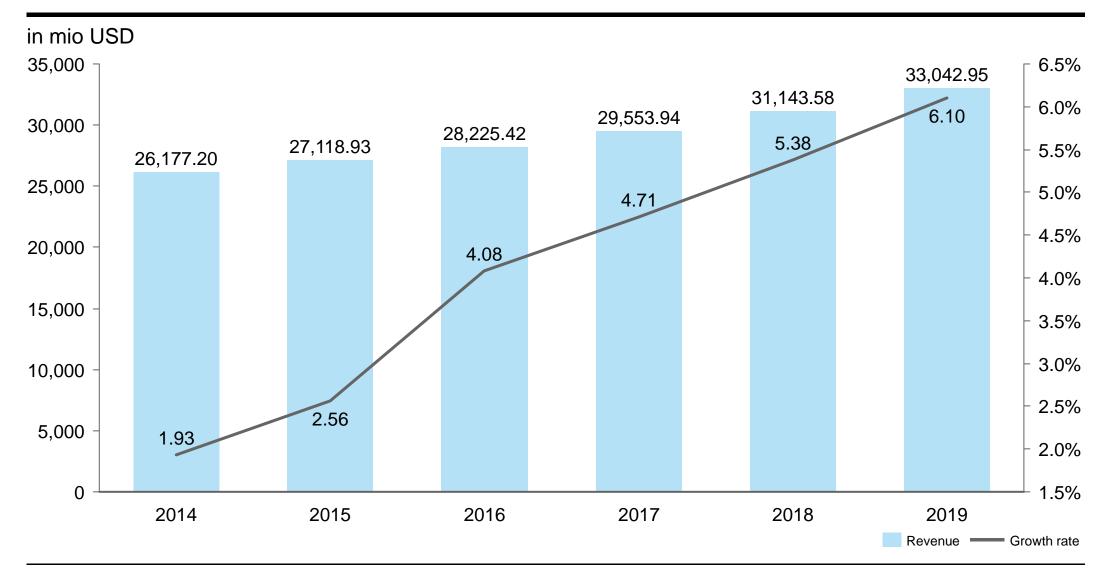
\$650 billion,
and expected to reach
over \$1 trillion
by 2030

<sup>&</sup>lt;sup>2)</sup> Source: 2015 World Alzheimer Report by Alzheimer's Disease International



## Global neurodegenerative disease market

#### Market overview





## Major exclusive alliance in Neurodegeneration

Celgene & Evotec

#### **Mission**

 Develop novel therapies for a broad range of neurodegenerative diseases, based on Evotec's unique patient-derived drug screening platform ("iPSCs")

### Strategic alliance Celgene & Evotec

- Upfront payment of \$ 45 m
- Potential milestones up to \$ 250 m and up to low double-digit royalties on all in-licensed programmes
- Initial term of the collaboration is five years
- Focus on Amyotrophic lateral sclerosis ("ALS"), Alzheimer's disease ("AD"), Parkinson's disease ("PD"), and multiple other neurodegenerative diseases
- Celgene holds exclusive options to in-license worldwide rights to Evotec programmes developed from the company's compound library



#RESEARCHNEVERSTOPS

NEWS RELEASE, 15 DECEMBER 2016

#### EVOTEC AND CELGENE ENTER INTO DRUG DISCOVERY COLLABORATION FOR NEURODEGENERATIVE DISEASES

 Exclusive broad R&D collaboration based on Evotec's unique induced pluripotent stem cell ("iPSC") platform which enables systematic drug screening in patient-derived disease models

#### Hamburg, Germany, 15 December 2016:

Evotec AG (Frankfurt Stock Exchange: EVT, TccDAX, ISIN: DE0003664809) announced today that Evotec and Celgene Corporation have entered into a strategic drug discovery and development collaboration to identify disease-modifying therapeutics for a broad range of neurodegenerative diseases. Initial disease areas of focus will include Amyotrophic lateral sclerosis, Alzheimer's disease, Parkinson's disease, and multiple other neurodegenerative disorders.

Evotee has built an industrialised iPSC infrastructure that represents one of the largest and most sophisticated iPSC platforms in the industry. Evotee's iPSC platform has been developed over the last five years with the goal to industrialise iPSC-based drug screening in terms of throughput, reproducibility and robustness to reach the highest industrial standards. This effort was enabled by a research collaboration and licence agreement with Harvard University involving world-leading scientists at the Harvard Stem Cell Institute. In particular, a collaboration termed CureMotorNeuron that was initiated in 2013 with the laboratories of Professors Kevin Eggan, PhD, and Lee Rubin, PhD, resulted in significant contributions to the platform. Additional aspects of the platform were built up through Evotee's more than 10-year collaboration with the CHDI Foundation in the field of Huntington's disease.

Under the terms of the agreement, Evotee will receive an upfront payment of \$ 45 m. Celgene holds exclusive options to in-license worldwide rights to Evotee programmes developed from the company's compound library. Evotee may be eligible to receive up to \$ 250 m in milestones as well as up to low double-digit royalties on in-licensed programmes. As part of the collaboration, Celgene may also elect to screen

For further Information, please contact: Gabriele Hansen VP, Corporate Communications & Investor Relations, gabriele hansen@evotec.com, T. +49.(0)40.56081-253, F. +49.(0)40.56081-333, www.evotec.com



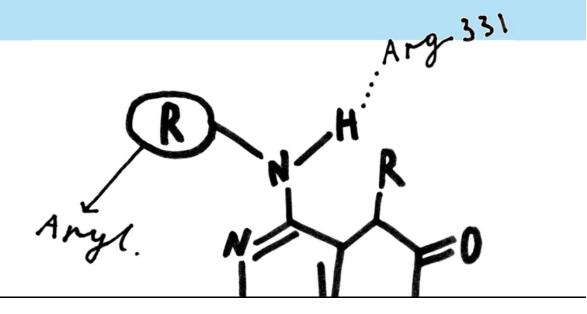
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## Last tick for 2016 done – A strong 2017 ahead of us

**EVT Execute & EVT Innovate** – Expected key milestones 2016

 New long-term deals with large and mid-sized Pharma



 New clinical initiations and good progress of clinical pipeline within partnerships



 Expansion of foundations and biotech network in USA/EU



 Expansion of network of top-class academic alliances



 New performance-based integrated technology / disease alliance



• Partnering of Cure X/Target X initiatives



Milestones from existing alliances



 Strong focus on iPSC (induced pluripotent stem cells) platform





