

# *Accelerating Treatments to Patients: The Experience of an Academic Spin-Out*

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# Disclosures

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- C<sub>2</sub>N Diagnostics

# About C<sub>2</sub>N Diagnostics

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- Formed in late 2007 by Professors Randall Bateman and David Holtzman (Wash U School of Medicine [WUSM], St. Louis, MO), and LifeTech Research
- Management and scientific team; C<sub>2</sub>N occupies ~4,500 sq. ft. of lab / office space in St. Louis, MO
- Owner or exclusive licensee to > 30 issued or pending patent applications and registered trademarks worldwide relating to the core technology platforms
- Private-public partnerships to advance goals

## *Mission*

Commercialize unique technologies to better detect, monitor, and treat Alzheimer's disease and other neurodegenerative disorders

# Business Strategy

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## Business Segments

1. Diagnostics – Preclinical detection / Therapeutic monitoring
2. Disease-modifying therapeutics for neurodegeneration

## Business Plan

1. Large-scale clinical validation studies of SILK™/SISAQ™ Assays
2. GLP  $\Rightarrow$  CLIA  $\Rightarrow$  IVD and novel biomarkers
3. First in man (FIM) study for lead therapeutic

## Partnerships

Establishing innovative partnerships with;

- Pharmaceutical companies
- Diagnostic and analytical tools companies
- Vendors within the supply chain
- Disease research foundations
- Academic centers

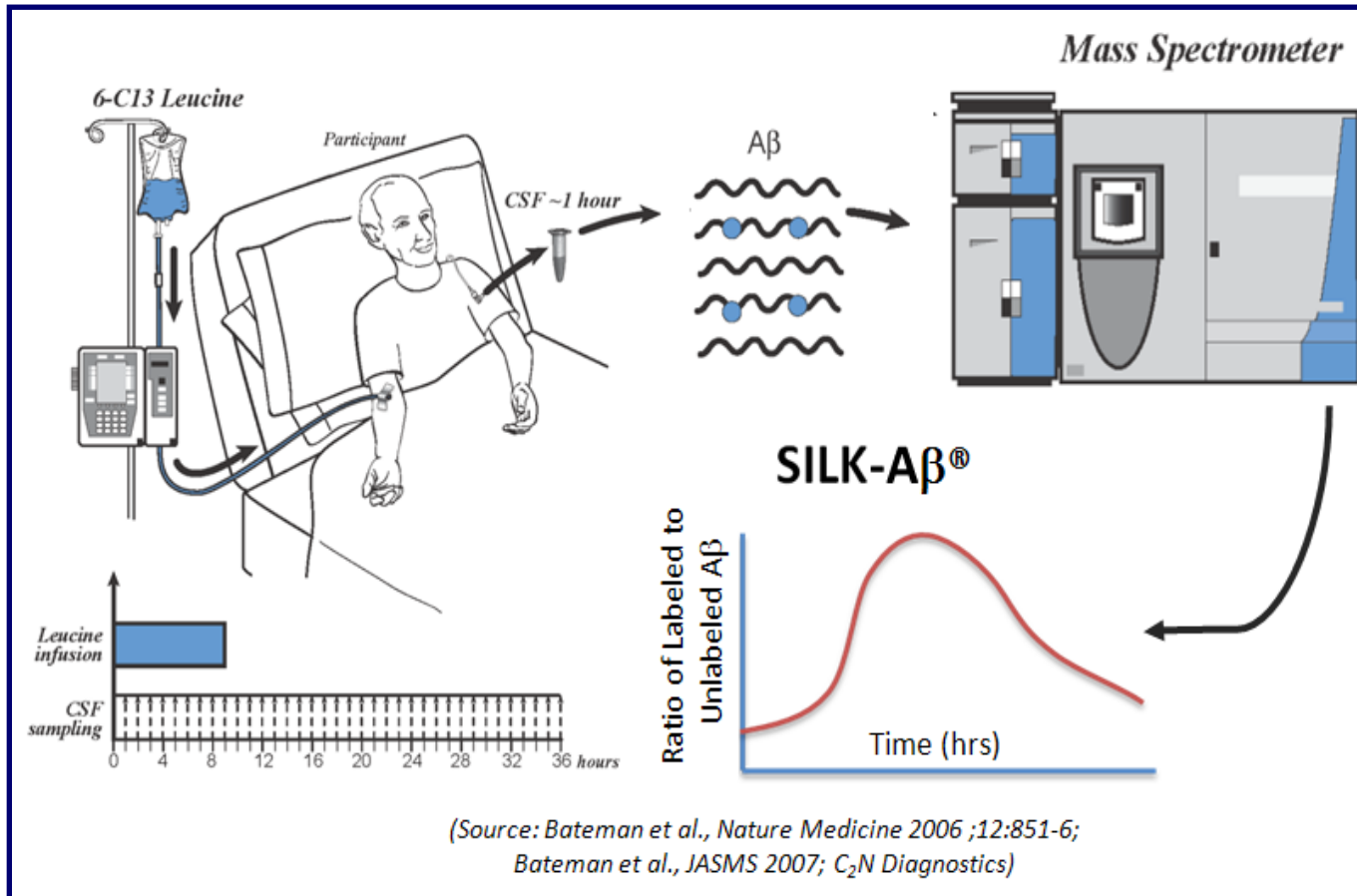
to accelerate commercialization of technologies.

# SILK™: The Nidus for C<sub>2</sub>N's Formation

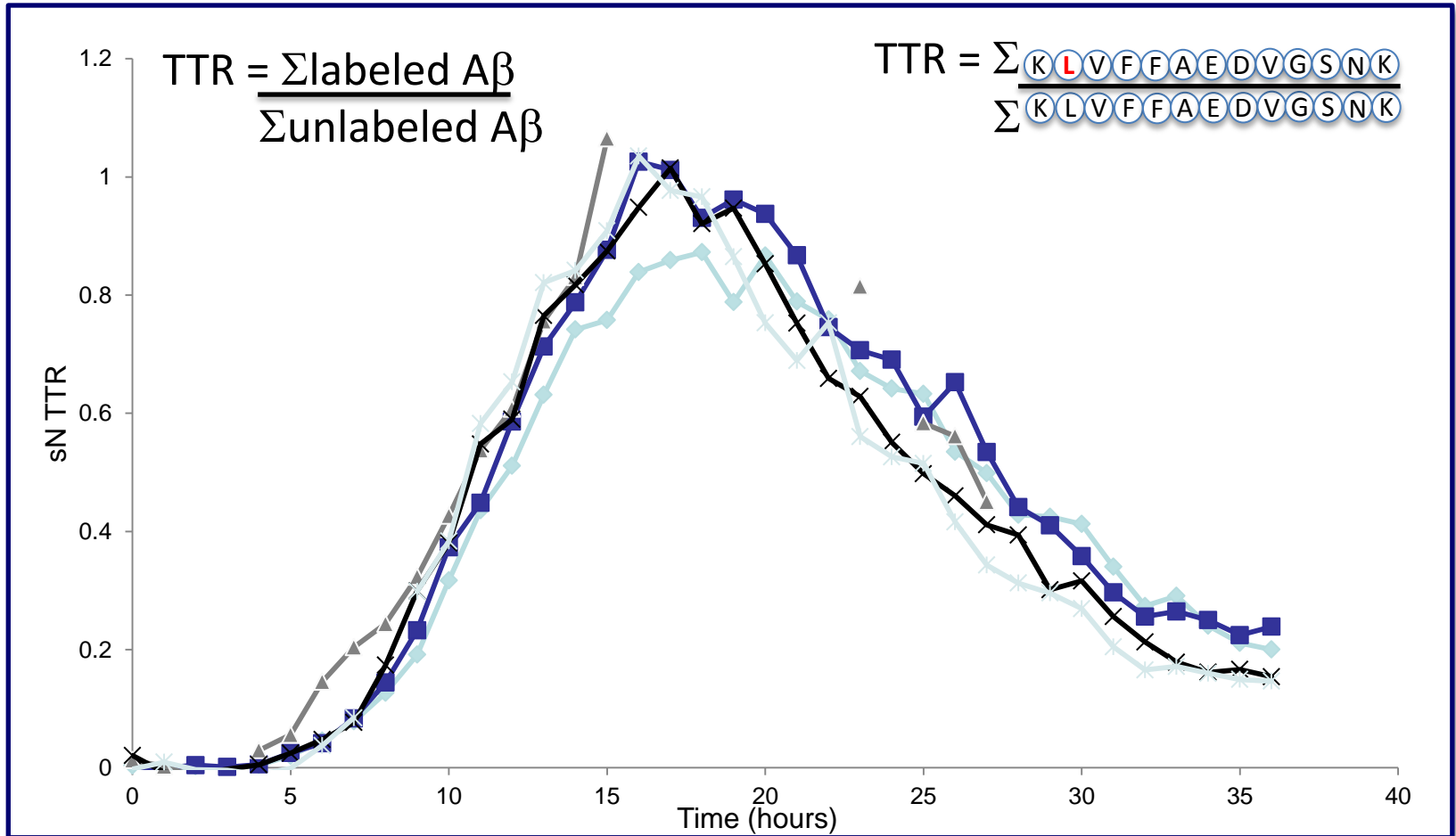
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- *In vivo* measurements of the kinetics/metabolism of brain-derived proteins and other biomolecules
- New window into CNS disorders of protein accumulation and impaired clearance (e.g., AD, PD, HD, FTD).
- Measure rates of biomolecule metabolism to determine normal physiology, pathophysiology, and treatment effects.
- Understand the physiology of CNS protein kinetics and changes that may lead to failure of normal mechanisms.

# SILK-A $\beta$ <sup>®</sup> Measures Kinetics of Newly Generated A $\beta$ (Fractional Turnover)

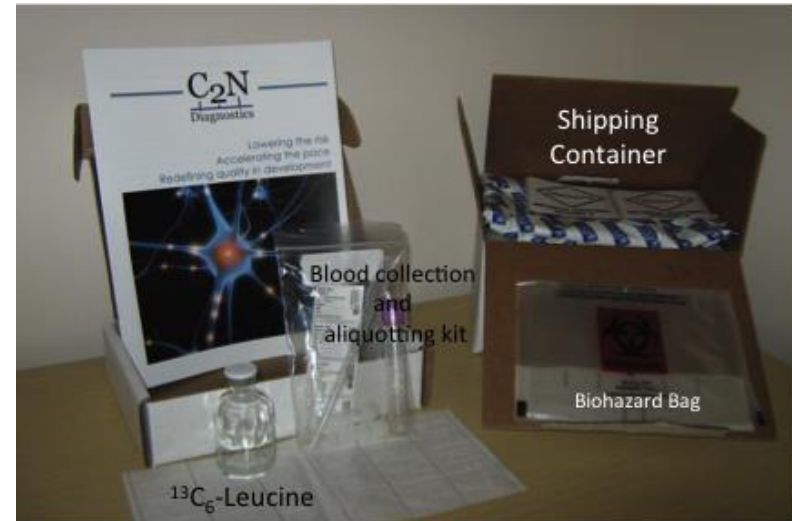
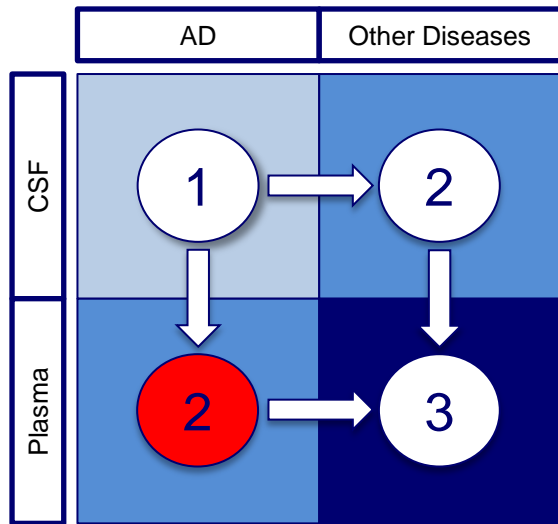


# Independent Validation of *In Vivo* Kinetics of $^{13}\text{C}_6$ -Labeled A $\beta$

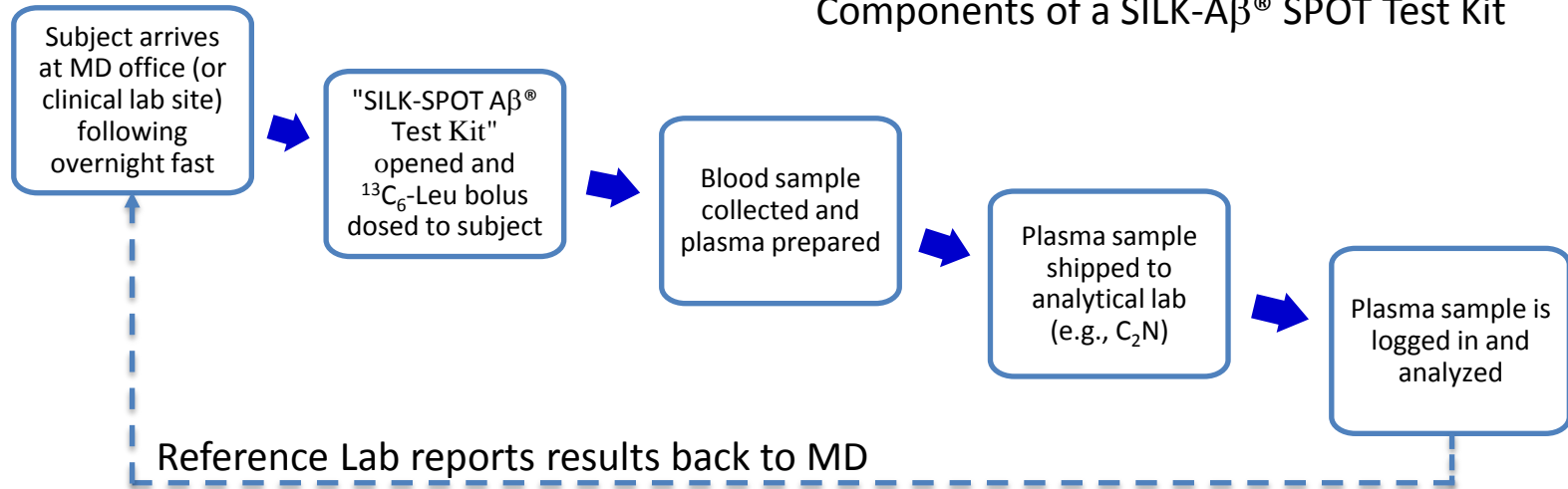


Total A $\beta$  Kinetics in 5 Healthy Volunteers  
Source: C<sub>2</sub>N Diagnostics, LLC

# Defining the “Diagnostic” Product: Development, Validation, and Logistics



Components of a SILK-Aβ<sup>®</sup> SPOT Test Kit





# Expansion of Product Portfolio at C<sub>2</sub>N → Consistent with Company's Mission

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- Library of murine antibodies directed against tau protein <sup>1,2</sup>, developed in the laboratory of Dr. David Holtzman at WUSM → exclusively licensed to C<sub>2</sub>N
- C<sub>2</sub>N advanced tau antibodies through further characterization, testing, and development
- On March 19, 2015, C<sub>2</sub>N and AbbVie announced “exclusive worldwide license agreement to develop and commercialize portfolio of anti-tau antibodies for the treatment of Alzheimer’s disease and other neurological disorders.”
- Generous funding support of Phase 1 study from Part The Cloud (Alzheimer’s Association) testing ABBV-8E12 (formerly C2N-8E12) in patients with PSP
- Now in two Phase 2 clinical studies: one in AD and one in PSP

1) Yanamandra et al., *Neuron* 2013; 80(2):402-410

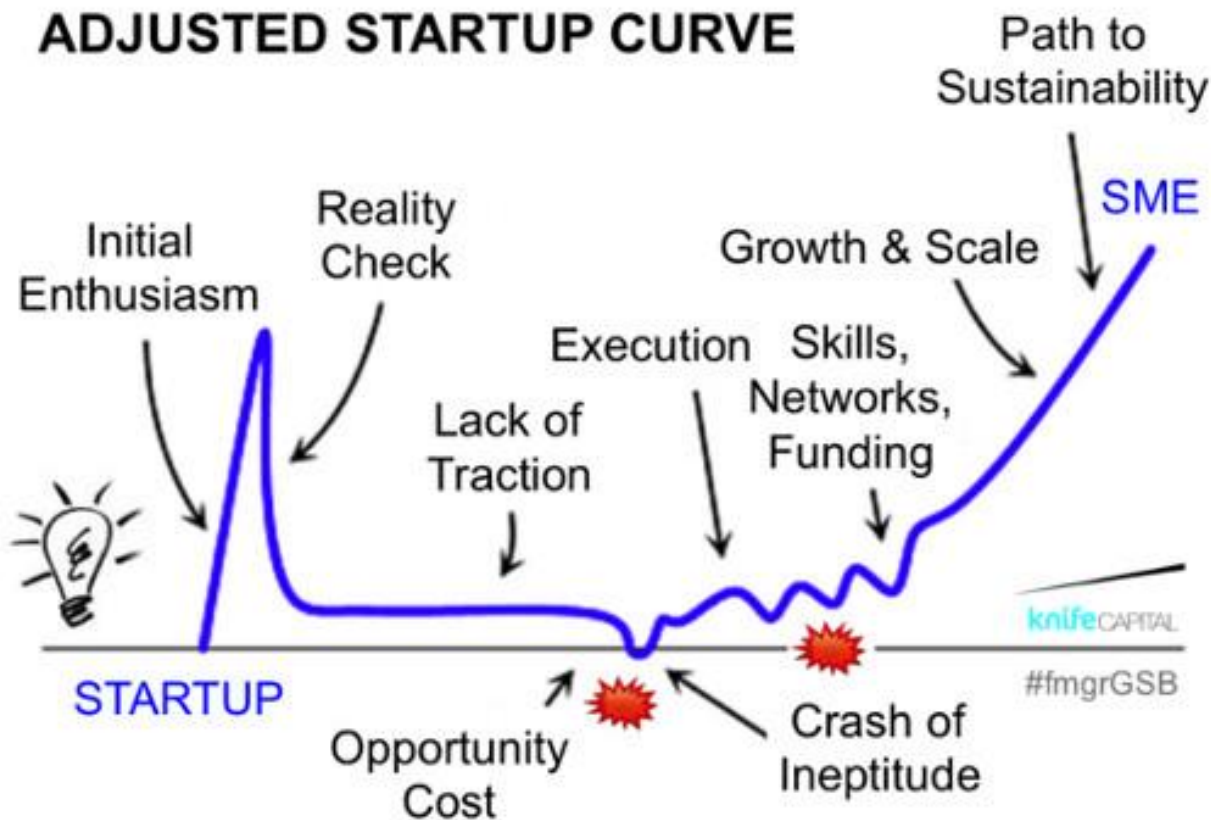
2) Yanamandra et al., *Ann Clin Transl Neurol* 2015; 2(3): 278-288

# WW-104 Study Testing Investigational C<sub>2</sub>N-8E12 (ABBV-8E12) in Patients with PSP

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- Randomized, double blind, placebo controlled, single ascending dose (SAD) study
- Study Objectives: Evaluation of the safety, tolerability, immunogenicity, and PK of single-dose of C<sub>2</sub>N-8E12 (dose range from 2.5 – 50 mg/kg)
- Sample size of 30 subjects with PSP: 24 drug, 8 placebo
  - Acceptable safety profile with no clinically concerning trends in number or severity of AEs between placebo and dosed patients
  - Plasma half-life and CSF:plasma ratio consistent with other humanized mAbs

# A Few Lessons Learned



Source: Adapted from Paul Graham's (Y-Combinator) StartUp Curve, [www.ventureburn.com](http://www.ventureburn.com)

# Key Ingredients



**TEAM**



# Team Construction

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- Models are wide-ranging (Completely virtual to fully integrated teams)
- Strong compatibility necessary between founding scientists and business partners
- Technology transfer can be optimized with (i) hiring individuals who bring continuity to the project; and (ii) independent replication of data as soon as possible
- Great project managers are necessary to manage outsourced processes
- A good lawyer engaged early can save future trouble and costs
- Experienced operators derive satisfaction from providing mentorship and advisory support

# Sourcing the Capital

## Key Questions

- What unmet medical need does your technology address?
- Who has unique interest?
- What is your timeline?
- What are your capital requirements?
- Are you building a product or a company?
- What are your own goals?
- Beyond capital, what do you need?
- What is driving your prospective investor(s) interests?



# Lessons Learned on Raising Capital

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- Surround yourself with as many smart people as possible
- Know what you want before you ask investors
- Define your value milestones and assume accountability
- Be passionate and dispassionate at the same time
- Behind every investment champion, there is a critic
- Perception is reality to investors, so understand the perception
- Seek profitability as soon as possible → this creates options
- Raising capital is not easy and it never really ends
- Evidence drives not only clinical adoption, but also investment and business development success

# Expert Risk Management Drives Commercial Success

## Technology Risk

- Single product vs. a technology platform?
- Stage of development – early feasibility or reproducible & robust?

## Market Risk

- “Red ocean” or “blue ocean” opportunity?
- Where is the unmet need?
- Who will pay?

## Intellectual Property

- Crowded or clear?
- Patentability? Freedom to Operate?
- A single provisional or a picket fence?

## Regulatory Risk

- NDA
- PMA vs 510(k)
- CE Mark

## Financing Risk

- Macroeconomy and microeconomy
- Cash runway & time / cost to achieve key milestones
- Exit strategy defined early with flexibility to adapt

## Management Risk

- Experience and decisiveness
- Risk tolerance?
- Compatibility



# Acknowledgements

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## **Team Members**

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Anonymous Sources