Corporate Presentation

Transforming Discovery Research into Innovative Medicines through Value-Based Partnership

CreaGen, Inc.
299 Washington Street
Woburn, MA 01801

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CreaGen, Inc.

Our Goal is to

"Create A New Generation of Small Molecules"

Through efficient and value-driven partnerships

Vision

- Offer true collaborative services to biotech, pharmaceutical companies and Federal Research Institutes to accelerate their discovery programs

- Build our reputation by exceeding customer expectations

Resources

- Established in 2003
- Corporate Headquarters: 299 Washington Street, Woburn, MA
- Scientists: Fifteen experienced chemists total, many with more than ten years in the pharmaceutical industry
- Existing laboratories: ~ 25,000 sq feet: newly expanded in January 2018
- Equipment: Waters LC-MS, Varian NMR (300 MHz), Waters auto purification system, Agilent analytical and Preparative HPLCs, Isco Combi-flash systems, TCAMs for parallel synthesis, Microwave synthesizer, Genevac evaporators, SFC Chiral Chromatography
- Library accessibility: online journal subscriptions, SciFinder and Beilstein/Crossfire access

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Team

- **Raj (SB) Rajur, PhD, Founder & CEO**

  30 Years of academic, industrial and management experience: ArQule, Millipore, Boston College, Northeastern University, Massachusetts General Hospital and Harvard Medical School

- **Hwa-OK Kim, PhD, Director of Chemistry**

  30 Years of industrial and management experience: Aurigene Discovery Technologies, Molecumetics, Marion Merrell Dow and New Mexico State University

- **Venugopal Rao, PhD, Associate Director of Chemistry**

  20 Years of industrial and project management experience: Pharmacopeia, Microbiotix, Indian Institute of Chemical Technology,

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SAB Team

- **Norton P. Peet, PhD,**

  40 Years of industrial and management experience: Aurigene Discovery Technologies, ArQule, Aventis, Marion Merrell Dow, University of Nebraska and Massachusetts Institute of Technology

- **Robert Perni, PhD,**

  30 years of industrial and management experience: Vertex Pharmaceuticals, Sirtris Pharmaceuticals, Sterling Winthrop, Avid Therapeutics, Dartmouth College, Northeastern University, University of Rochester

- **Mark Tebbe, PhD,**

  30 years of Industrial and management experience: Co-founder of Quench Bio with Atlas Venture and of Arix Bioscience, EIR at Atlas Ventures, Quartet Medicine, Forma Therapeutics, Eli Lilly, Stanford University and University of Notre Dame.

- **Vinod Patel, PhD,**

  25 years of industrial experience: Founder, TME therapeutics, Amgen, Kinetix pharmaceuticals, Sanofi-Genzyme and University of Nottingham.

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Expertise

Medicinal Chemistry:

- Small Molecules, High Throughput parallel library synthesis and purification
- Lead Generation and Lead Optimization
- Conjugation Chemistry, Antibody Drug Conjugates (ADC)
- Macrocycles and Macrocyclic libraries. Cyclic peptides
- Nucleosides and Nucleotides, Peptides and Peptide Nucleic Acids (PNA)
- Carbohydrates and unnatural amino acids

Analytical Chemistry:

- High Throughput purification and analysis

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Why Collaborate with CreaGen

- CreaGen is a US based company located in Massachusetts
- CreaGen has an established track record with biotech and large pharmaceutical organizations
- Interdisciplinary strengths at CreaGen insure that customers receive the best value for their investment

CreaGen's Competitive Advantage:

- Flexibility, competitive pricing and fast turnaround time
- Dedicated project teams and segregation of projects
- Special request capabilities
- Automated parallel synthesis and separations
- Customized data input and output
- Multiple sample delivery formats: dry, in solution, standardized amounts/concentrations, multiple copies, etc.

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Services

CreaGen performs services that are:

--project-based

--FTE-based

--collaboration-based

- Medicinal chemistry and lead optimization
- Building blocks/scaffolds/key intermediates
- Customer tailored focused libraries
- High throughput purification and QC solutions

Case studies: Representative Examples

CS I: Multinational Pharma (Oncology) : Lead Optimization

Project requirements:

- Design and optimize leads, synthesize novel analogs of the leads for weekly screening
- Provide all medicinal chemistry expertise to client in designing new analogs and libraries. Explore new synthetic routes.

Accomplishments:

- 3-Year collaboration FTE based contract
- Provided more than 600 compounds and many novel scaffolds during the tenure of the program. True extension of customer's chemistry program

CS II: Multinational Pharma : Antibody Drug Conjugates (ADC)

Project requirements:

- Design and synthesize novel linkers. Conjugate novel small molecules and drug candidates to linkers. Introduce reactive functionalities on the linker to conjugate to antibodies.
- Provide conjugation chemistry expertise to client. Synthesize libraries of small molecules. Explore new synthetic routes.

Accomplishments:

- 2-Year FTE based collaboration
- Provided several conjugates to client for screening. Developed several novel hydrophilic molecules to conjugate to antibodies to minimize aggregation. True extension of customer's ADC program

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Case studies: Representative Examples

CS III: Biotech. (Anti-infective): NIH & funded projects: (CreaGen -subcontractor)

Project Requirements:

- Design and synthesize novel scaffolds and develop new and efficient routes for the synthesis
- Provide multi-gram quantities of final compounds for in vivo tox studies with aggressive timeline
- Perform process development for multi-step synthesis of scaffolds and lead molecules

Accomplishments:

- Five year collaborations: Provided 20 scaffolds and associated libraries and several multigram scale non-GMP compounds for *in vivo* tox studies

CS IV: Biotech. (Anti-infective): Lead Optimization

Project requirements:

- Function as medicinal chemistry department
- Provide all medicinal chemistry expertise to client in designing new analogs
- Develop SAR and interpret weekly screening results with client and suggest new ideas

Accomplishments:

- Expanded collaboration to 8 FTEs: company sold to Biota Australia

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Case study: Representative Examples

CS V: NIH

a) NCATS: Synthesis of commercial preclinical candidate

Project requirements and accomplishments:

- Synthesis of 10 grams of ERK inhibitor
- Completed the synthesis within budget and delivered the compound on time.

b) NCI: Synthesis of commercial preclinical compound

Project requirements and accomplishments:

- Synthesis of 10 grams of MMP inhibitor
- Completed the synthesis and delivered the product on time

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Case studies: Representative Examples

CS VI: Small Biotech (Diabetes): Lead Optimization

Project requirements:

- Function as *de facto* medicinal chemistry department
- Provide all medicinal chemistry expertise starting with design discussion, literature searches, hit-to-lead evaluation, SAR studies, lead optimization, identification and selection of high-value preclinical candidates

Accomplishments:

- Generated IP for their AMPK program in seven months
- Provided a nanomolar compound and several backup compounds with activities in the micromolar range
- Expanded to 4 FTEs
- Project grew as milestones were delivered and the program was licensed to Debiophama

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Small Molecule Library Synthesis (examples)

Partner	Biotech	Multinational Pharma	Small Biotech
Project	Hit to Lead	Hit to Lead Optimization	Exploratory to Hit/Lead
Duration	2.5 years	3.5years	2 years
FTEs involved	1~1.5	2~4	2~4
# of compounds	750	600	2500
library synthesis: Synthetic steps	1~3	6~7	5~6
Library synthesis Method	solution phase parallel synthesis	solution phase parallel synthesis	solution phase parallel synthesis
Qty of compounds	10-20mg	Ave 50mg	Ave 20mg
Qty for scaffolds /intermediates	2g to 50g	1g to 100g	1g to 30g
Purity	90 to 98%	90 to 98%	90 to 98%
Analytical data	1H NMR, 13C NMR, 2D NMR, LC-MS, HPLC, elemental analysis, HRMS etc	1H NMR, 13C NMR, LC-MS, HPLC, elemental analysis, HRMS etc	1H NMR, 13C NMR, LC-MS, HPLC, elemental analysis HRMS etc
Resulted in	Lead Optimization	Filed patent: _ Lead Optimization	Filed patent: _ Lead Optimization

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CreaGen Synthesized Compounds: Various Stages in Partner Programs

Partner	Therapeutic Area	Lead Discovery	Lead Optimization	Clinical Candidate	Phase I, II & III
Multinational Pharma	Cancer				
Biotech	Diabetes				
Biotech	Anti-infective				
Biotech	Anti-infective				
Biotech	Cancer				
Biotech	Cancer				
Biotech	CNS				
Asian Biotech	Cancer				
European Pharma	Diabetes				

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CreaGen Infrastructure & Equipment

CreaGen parallel synthesis platform

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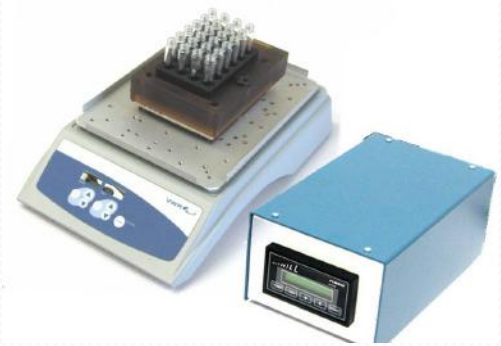
CreaGen parallel synthesis work stations

- 1, 2 and 4 position heater/shakers
- Heating up to 150ºC
- Variable speed vortexing
- Timed shutoff
- Integration with automation



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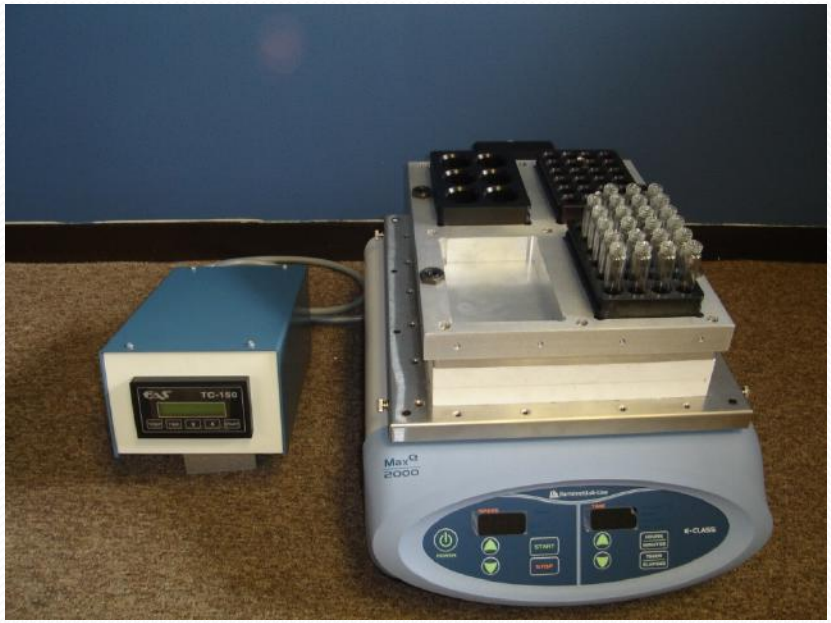
Synthesis work stations: cont'd



Parallel synthesizer

High speed evaporator
GeneVac (*EZ2*)

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CreaGen purification work stations

Mass directed purification

Chiral purification: SFC

CreaGen analytical work stations

Varian, 300 MHz NMR

TQ- LCMS

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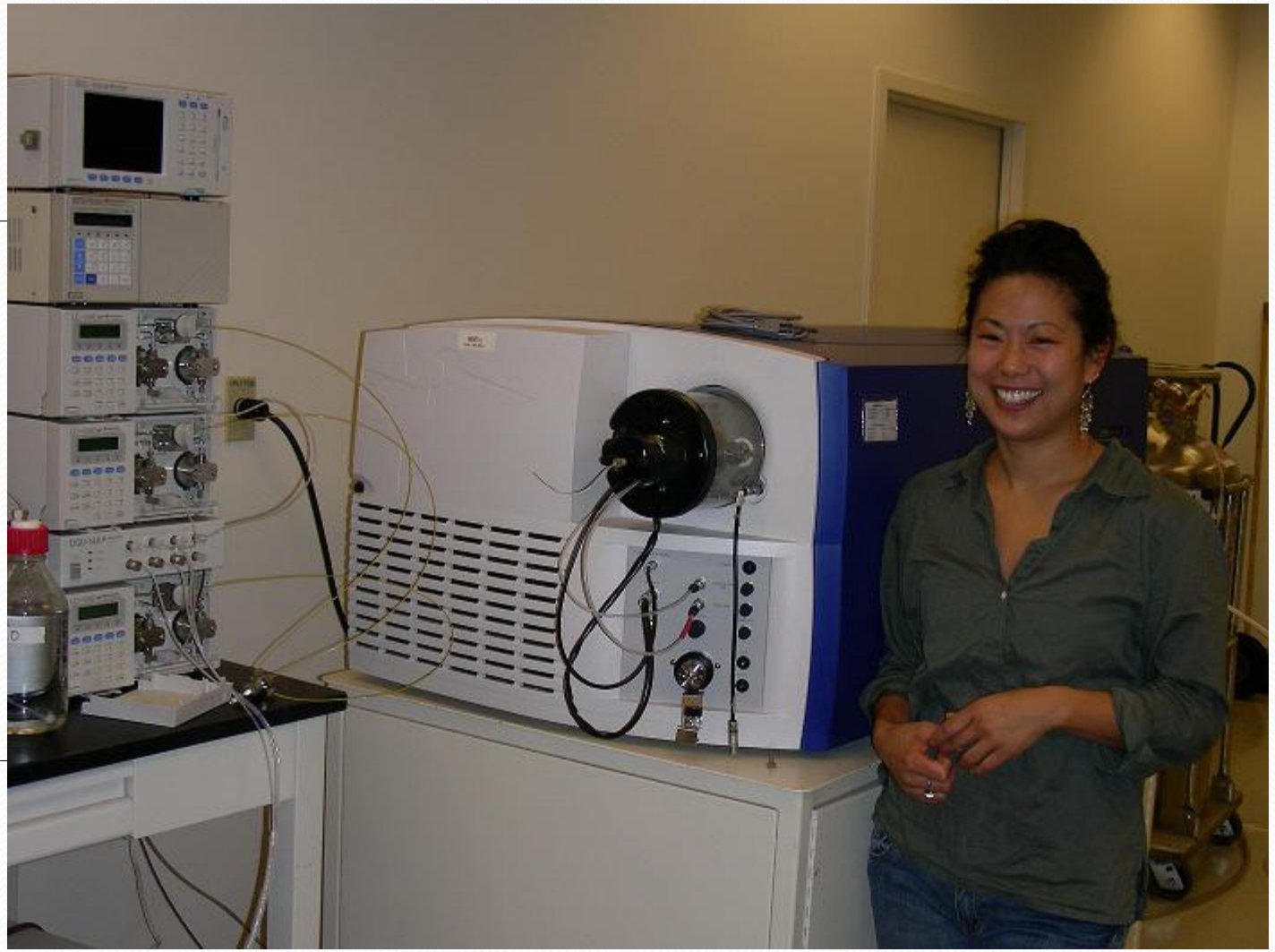
CreaGen: LCMS



Summary

- Competitive pricing
- Excellent communication
- Quality services
- On-time delivery
- Customer satisfaction