



**Genentech**  
*A Member of the Roche Group*

# Green BioPharma @Genentech

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May 2013  
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- Genentech Backgrounder
- Definition of Green BioPharma
- Green Chemistry at Genentech
- Organizational Change Model
- Strategic Focus Areas and Success Factors
- Highlights of Accomplishments to Date
- Roadmap

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# Backgrounder

Genentech fully owned by Roche since 2009

Genentech South San Francisco (15,000 EEs)

- US Roche HQ, R&D, biologics development, mfg, sales/mktg
- Global clinical development

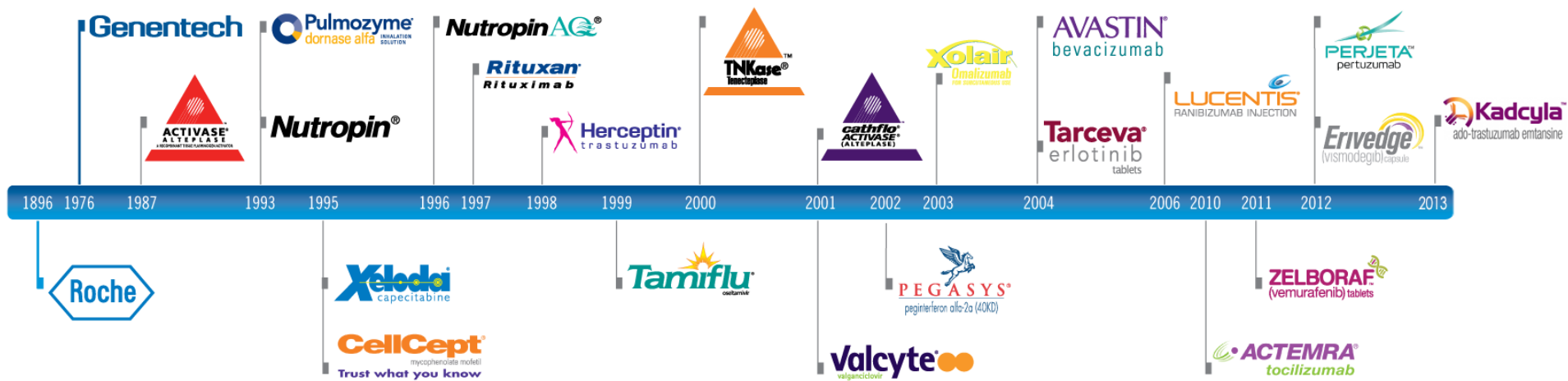
Biologics → Small molecule, ADCs

Strong mission-oriented corporate culture, driven by science and innovation and patients

Oncology, immunology, metabolism; new: neuroscience, infectious diseases

Roche Group commitment to stay on DJSI (top 3 among health care)

1500 Green Genes Team members in SSF



## Pharmaceuticals, broadly categorized

### Small molecules

- low molecular weight (<500 g/mol)
  - examples: aspirin, OTC drugs
- manufacturing process: chemical synthesis
- **environmental impact: solvents, energy**

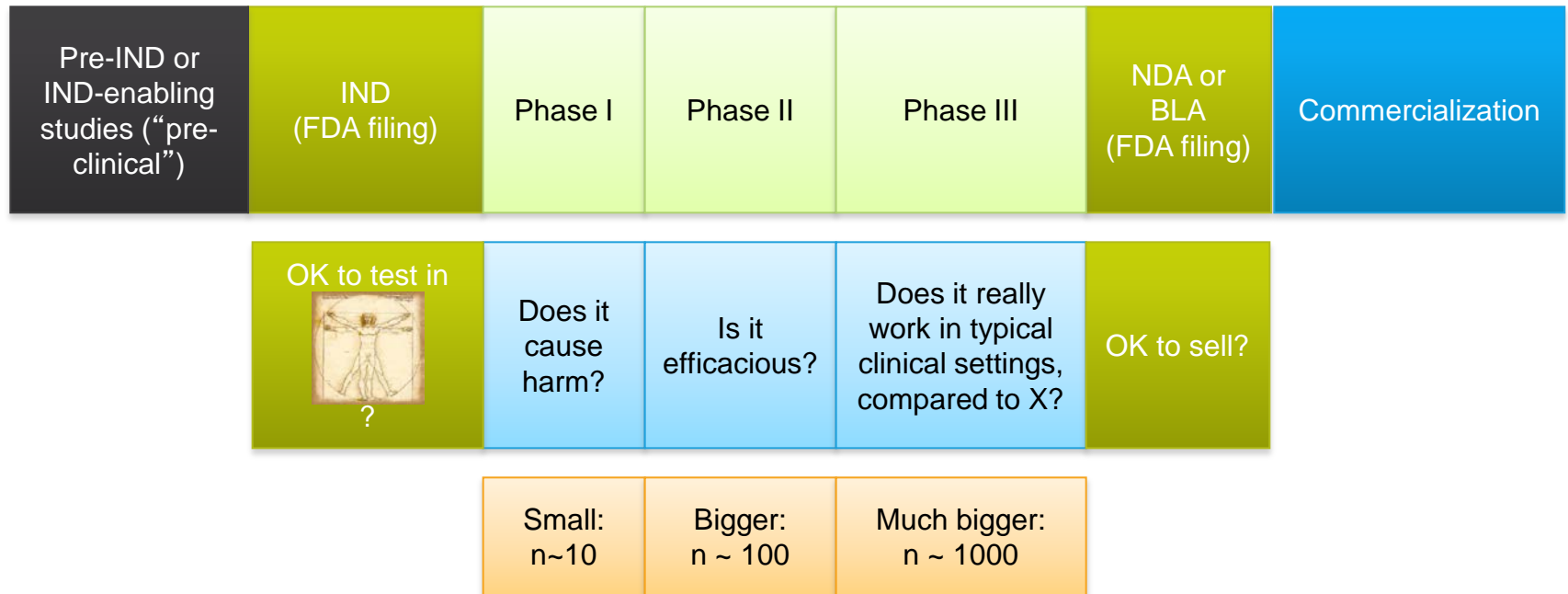
### Large molecules (aka biologics)

- high molecular weight (~10,000 daltons), aka “macromolecules”
  - examples: proteins, growth hormone, insulin
- manufacturing process: grow genetically modified cells (microbrewery meets high tech)
- **environmental impact: water use (cleaning), certain materials and chemicals; energy**

Traditional Pharma: small molecules

Biotech: large molecules

Trend and future: each is moving into the other's space → biopharma



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### Definition

Green BioPharma is the design, development, and implementation of biological and chemical products and processes that reduce or eliminate the use and generation of substances hazardous to human health and the environment.



### Vision

With the incorporation of Green BioPharma:

- Customers, business partners, and the community regard Genentech as a leader in efforts that **reduce its ecological footprint resulting from its core competencies**.
- Employees continuously **innovate**, evaluate, and implement ways to reduce the environmental impact of their decisions and operations.
- Wherever possible, the result of green innovations are **quantified**.

*Green BioPharma forges the bridge between patients, people and the environment.*



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# Green Chemistry @Genentech: a short timeline

## ~2009

- Roche Technical Working Group on Green Chemistry established
  - 1-2 Genentech process chemists involved
  - sponsors lectures and annual process chemistry contest
  - limited exposure to rest of company
  - no organizational structures

## Fall 2011

- Green Genes lunch and learn talks by Green Chemistry scientists at UCB
  - Great response from employees
  - Green Genes subteam
- Launched the Green BioPharma Program
  - Hired a Green BioPharma Project Manager
  - Established Green BioPharma Steering Committee, as part of Sustainability Council

## 2012

- Steering Committee endorsed 2012 goals and projects
- Green Genes Subteam is ~~28~~ 130 volunteers

## 2013

- Published a video on this effort

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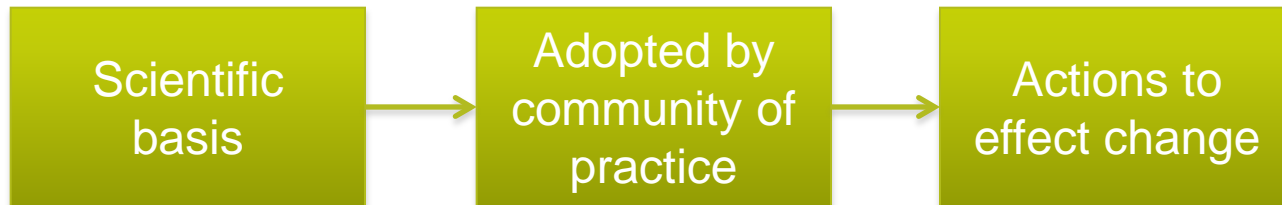
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All efforts are rational, scientific, scalable  
Presented as opportunities for innovation  
Behavioral changes lead to influencing decision-making

Changes must be at parity if not superior to existing processes/products.



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## Cross Functional Collaboration → Scalability

- Helps create a unified perspective for Genentech

## Leadership Endorsement → Institution Building

- Legitimizes new efforts
- Leaders tend to be Connectors who can find Mavens

## Employee Engagement → Leadership Development

- Green Genes sub-team, to test products, share best practices, pilot programs (share learnings on Wiki)

## Industry Benchmarking → Industry Leadership

- Who's doing what? Peer pressure motivates, validates



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## Internal

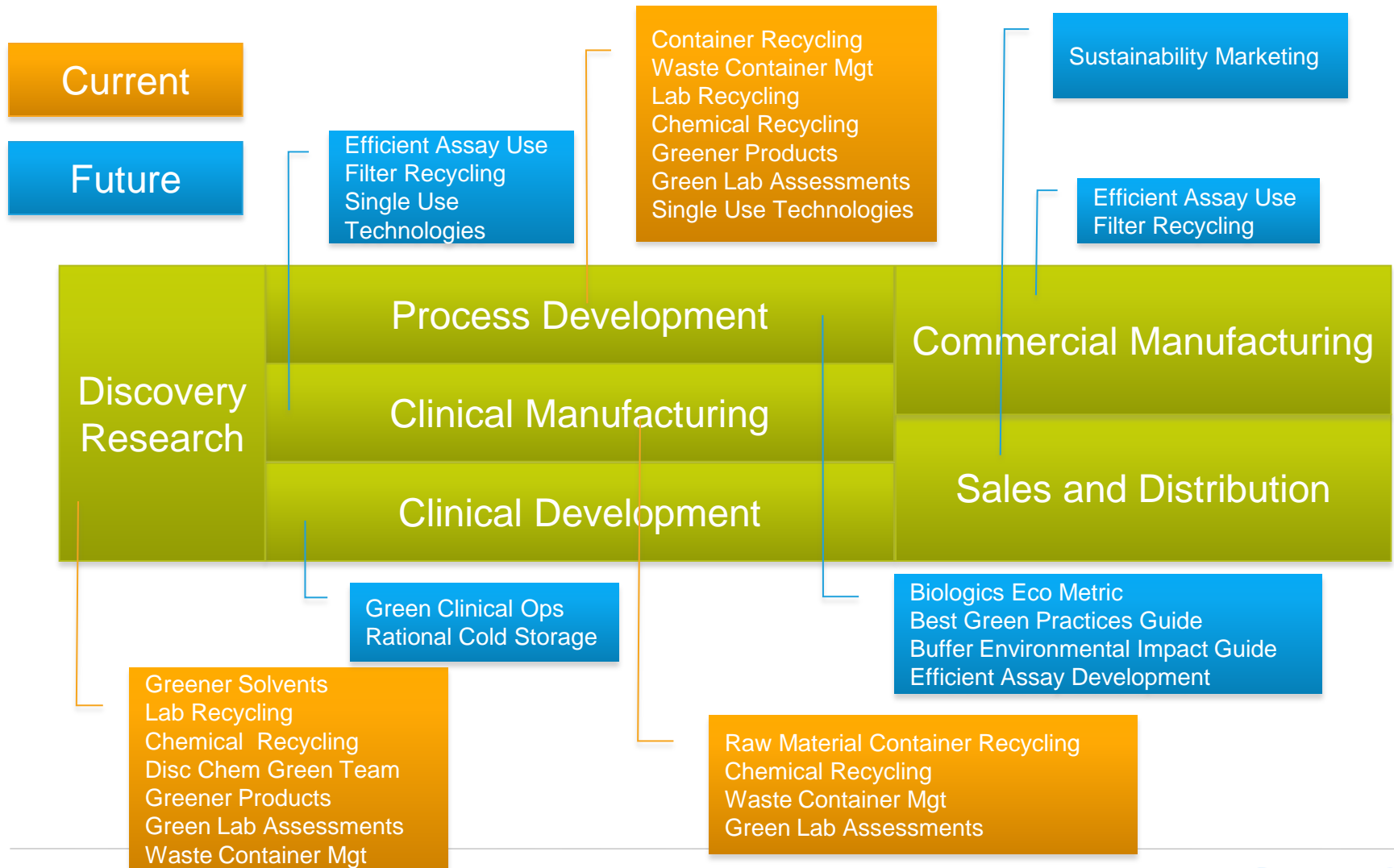
- Steering Committee empaneled and meeting monthly
- 11 of 12 goals completed in 2012
- Positive results of proof-of-concept of GB PM role
- Program documentation

## External

- Discovery Chemistry Green Team established
  - driving green solvent substitution
  - entirely staffed and led by Disc Chemistry employees
  - has VP approval
- Surplus Chemical Recycling Program piloted & improving
- Performed 10 Green Lab Assessments
  - building a network of peer resources to demonstrate and share best green practices in labs
- Container recycling/diversion, saving \$10,000s in supplies and waste costs.
- Industry collaboration to develop Green BioPharma tools
  - BioPharma Focus Group of the Pharmaceutical Roundtable of the ACS Green Chemistry Institute

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# Greening Genentech's core competences: a roadmap



# Acknowledgements

## Genentech EHS

Bruce Maeda, Director  
 Marlene Kosinski, Acting Director  
 Jon Kawamoto, Sr Mgr, Environmental Group

## GB Steering Committee

Tina Larson, Sr. Dir, Process Dev (Executive Sponsor)  
 Ekta Mahajan, Sr. Engineer, Process Dev Engineering  
 Debbie O'Connor, Sr. Mgr, Pilot Plant  
 Asha Radhamohan, Engineer, Process Dev

Jacob Corn, Scientist, Early Development Biochemistry Research  
 Stefan Koenig\*, Scientist, Small Molecule Process Chemistry Research

Joe Jerkins, Sr. Mgr, Quality Systems, Production  
 Srinavyana Vutukuru, Engineer, Manuf Sci & Tech

Tse-Sung Wu, EHS (Team Lead)  
 Kristi Budzinski, EHS (GB Project Mgr)

\*Chair of the Roche-Genentech Green Chemistry Technical Working Group

Process Dev

Research

Manufacturing

**Bruce Roth, VP Discovery Chemistry**

**Many Green Genes volunteers and emerging leaders**



## Better Chemistry Video Clip (3:35)

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[http://www.youtube.com/watch?v=R2\\_0i-6nyQ0](http://www.youtube.com/watch?v=R2_0i-6nyQ0)



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