Medicago: progrès et stratégies

Dr. Louis Vézina, CSO

April 18th, 2007

Forward Looking Statements

All statements, other than statements of historical facts, included in this presentation regarding our strategy, future operations, financial position, future revenues, projected costs, prospects, plans and objectives of management are forward-looking statements. The words “believe”, “anticipate”, “estimate”, “plan”, “expect”, “intend”, “may”, “project”, “will”, “would” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We cannot guarantee that we actually will achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. There are a number of important factors that could cause our actual results to differ materially from those indicated or implied by forward-looking statements, including the factors discussed under “Risk Factors” and in other sections of the prospectus. These factors and the other cautionary statements made in the prospectus should be read as being applicable to all related forward-looking statements wherever they appear in this presentation.

Our statements of “belief” in respect of our product and partner product candidates are based primarily upon our results derived to date from our research and development program. We believe that we have a reasonable scientific basis upon which we have made such statements. It is not possible, however, to predict, based upon studies in vitro and animal studies whether a new therapeutic agent or technology will be proved to be safe and/or effective in humans. We cannot assure that the particular results expected by us will occur.

Any forward-looking statements and statements of “belief” represent our estimates only as of the date of the prospectus and should not be relied upon as representing our estimates as of any subsequent date. Except as required by law, we do not assume any obligation to update any forward looking statements or statements of “belief”. We disclaim any intention or obligation to update or revise any forward-looking statements or statements of “belief”, whether as a result of new information, future events or otherwise.

Agenda

1. Medicago aujourd’hui
   - Stratégie
   - Technologie

2. Vaccins grippe aviaire

3. Produit hypocholestérolémiant

4. Cellulases

Medicago

Based in	**Quebec city, Canada**
Listing	**TSX-V: MDG (Since August 30th, 2006)** **Current stock Price*: $0.85 ($0.60 – $1.24 range)** **Oustanding shares: 17.1M - Market cap*: $14.5M** **Fully diluted: 22.9 M**
Employees	**37**
Technology	**Proprietary plant-based protein production technology**
Products	**Influenza vaccines** **enzymes (bio-fuel), nutraceutical (saponin)**
Facility	**Quebec city - 14 000 sq. feet**
Partnerships	**Acambis, CEMA**

***: On April 3, 2007**

1. Le projet vaccin influenza

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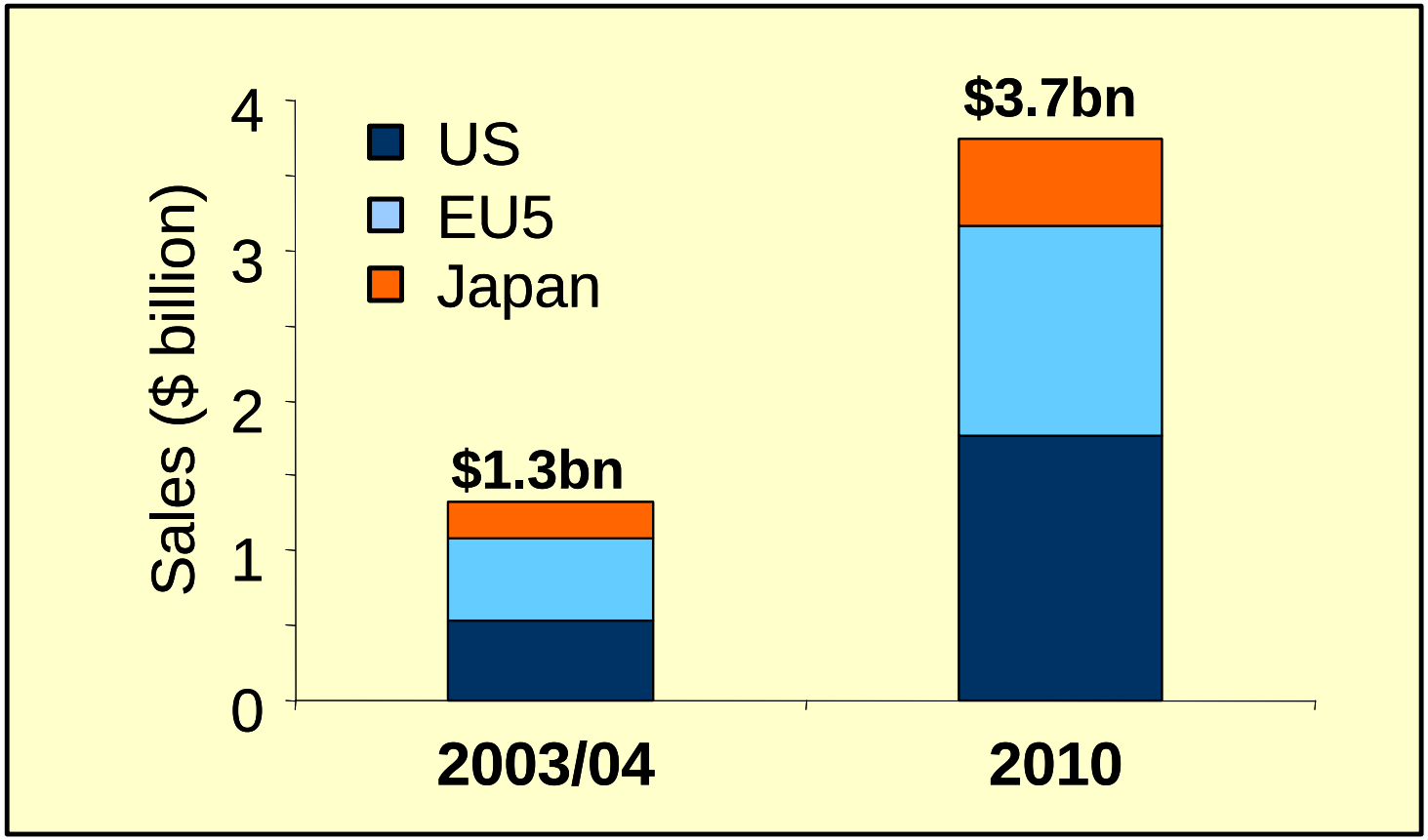
Le marché de l'influenza

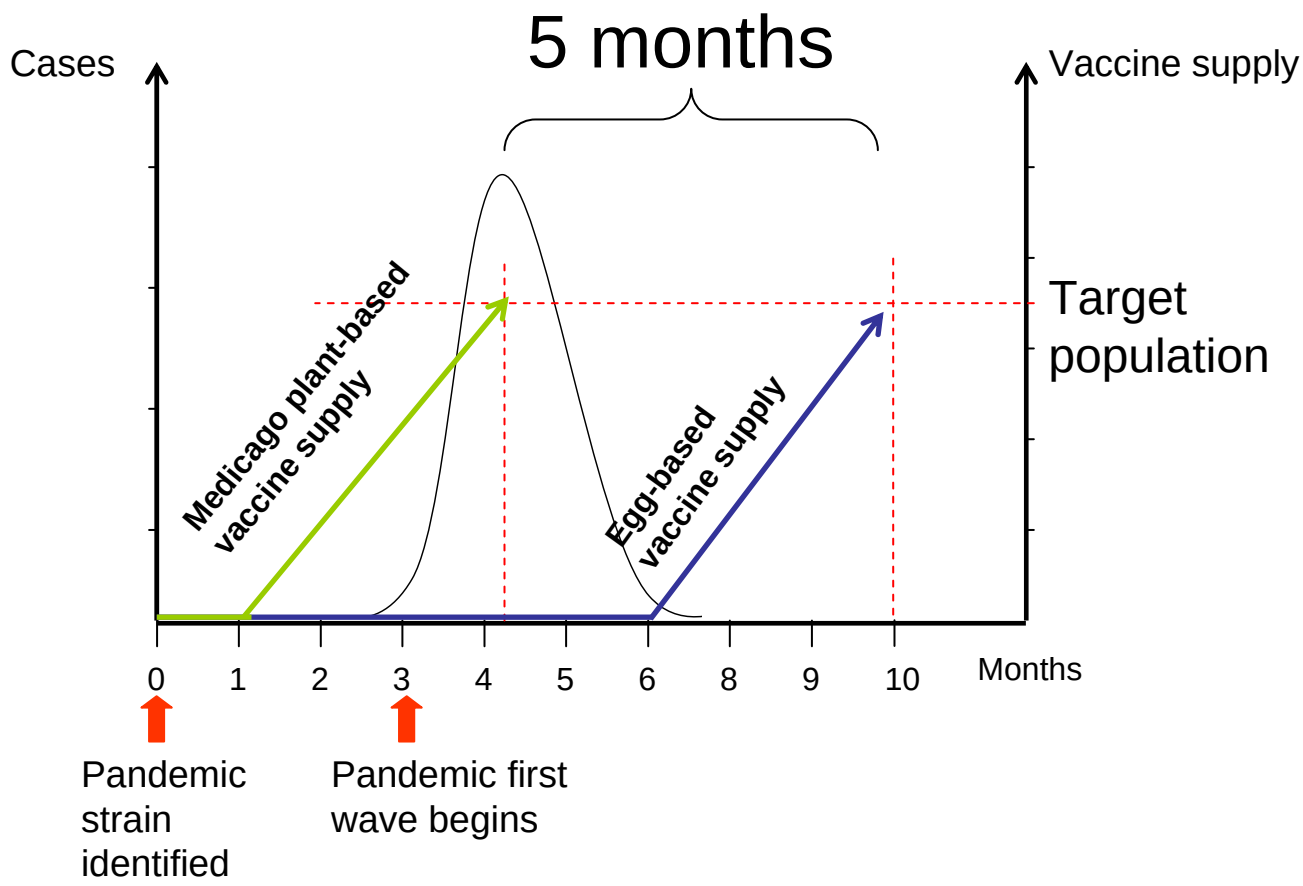
Market expected to expand over $3.7 billion by 2010



Source: Datamonitor

La solution de Medicago: pandémique

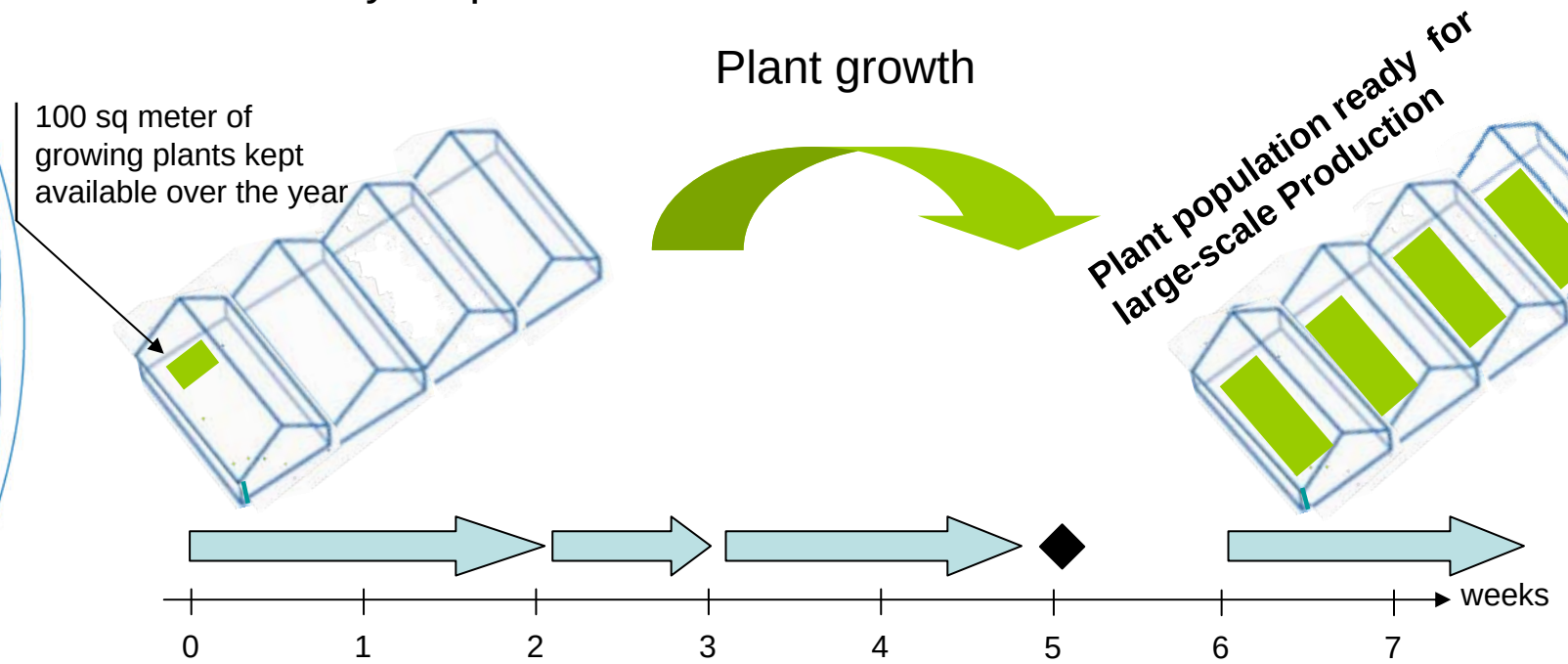
First responder, first to market



Scenario pandémique

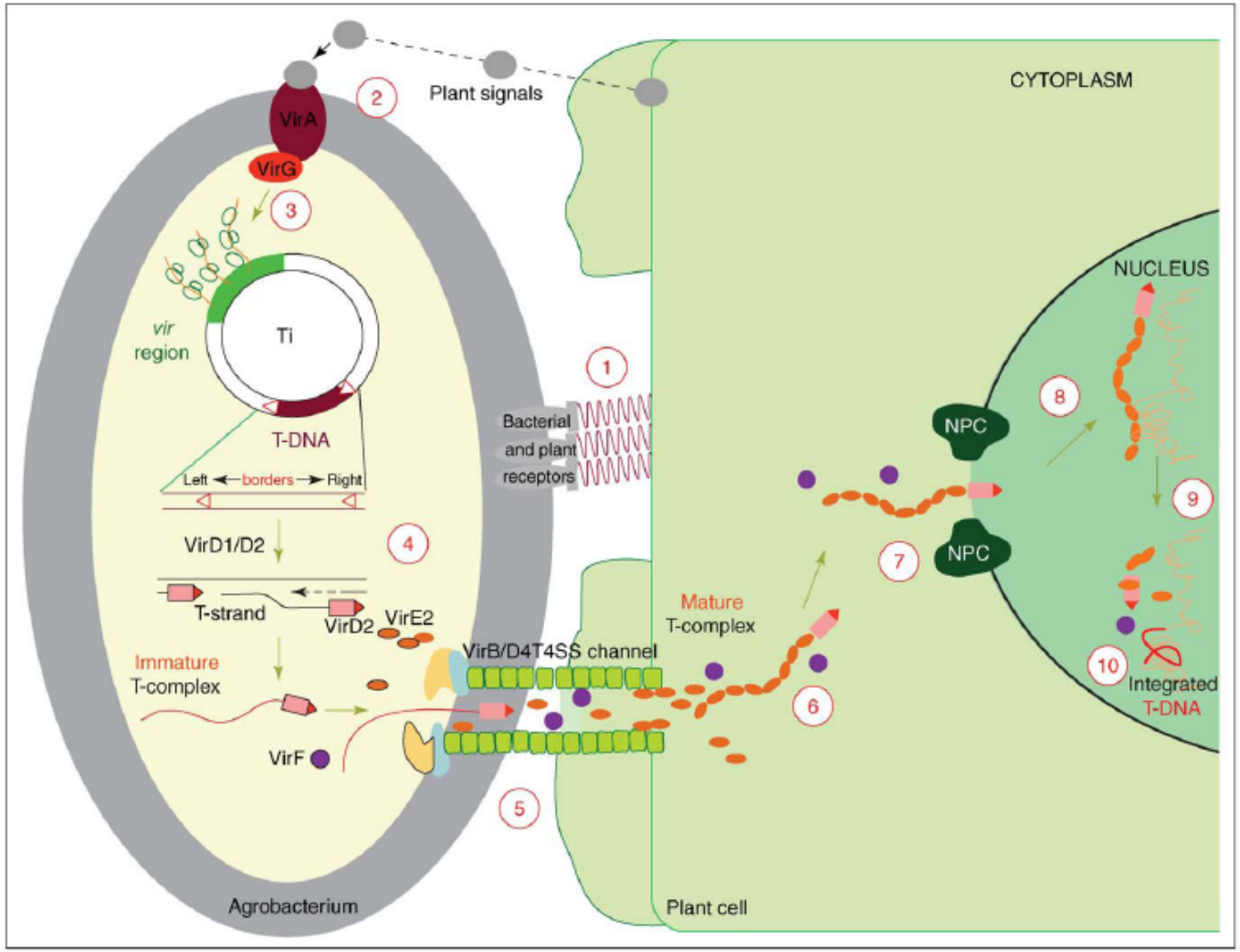
Surge capacity

5 weeks –ready for production



Identification of the new strain by world agencies (WHO, Health Canada)

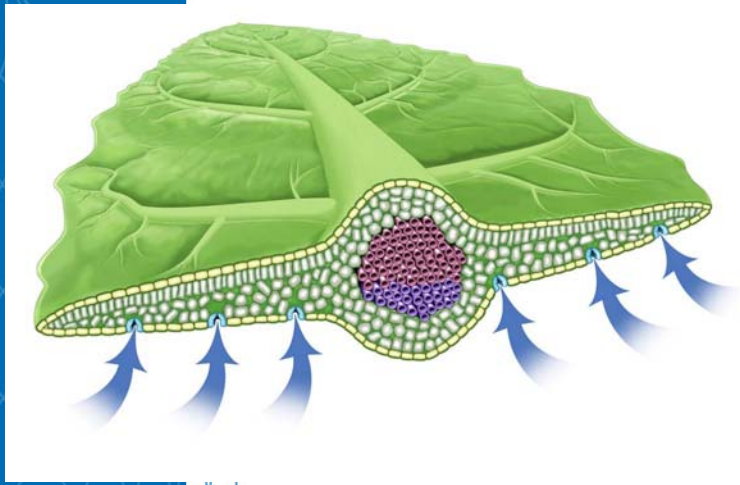
Vaccine ready for testing



A model for the *Agrobacterium*-mediated genetic transformation. The transformation process comprises 10 major steps and begins with recognition and attachment of the *Agrobacterium* to the host cells (1) and the sensing of specific plant signals by the *Agrobacterium* VirA/VirG two-component signal-transduction system (2). Following activation of the *vir* gene region (3), a mobile copy of the T-DNA is generated by the VirD1/D2 protein complex (4) and delivered as a VirD2–DNA complex (immature T-complex), together with several other Vir proteins, into the host-cell cytoplasm (5). Following the association of VirE2 with the T-strand, the mature T-complex forms, travels through the host-cell cytoplasm (6) and is actively imported into the host-cell nucleus (7). Once inside the nucleus, the T-DNA is recruited to the point of integration (8), stripped of its escorting proteins (9) and integrated into the host genome (10). A detailed model of the host cellular mechanisms and the role of plant-specific factors in the transformation process are given in Figure 2. (This illustration was reproduced, with modifications, from [28•] with permission.).

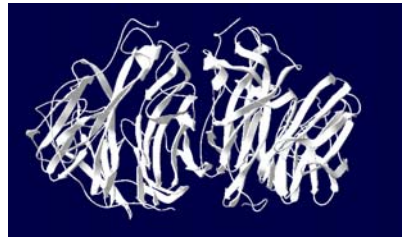
Figure 3. Illustration of *Agrobacterium* infection of a plant cell. *From Tzfira and Cytovsky, Current Opinion in Biotechnology 2006, 17:147-154.*

Medicago's Production Facility

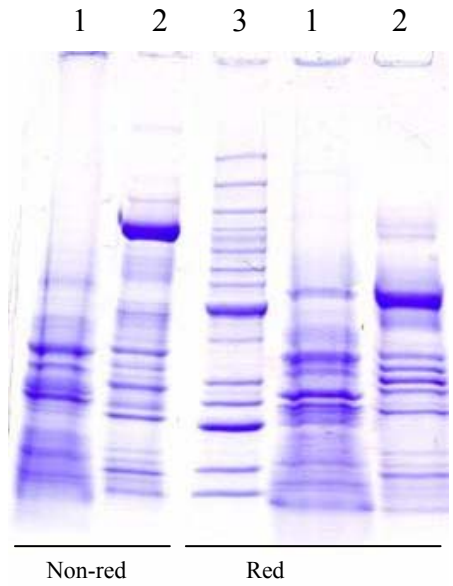


- non-transgénique
- reproductible
- Performant
- cGMP

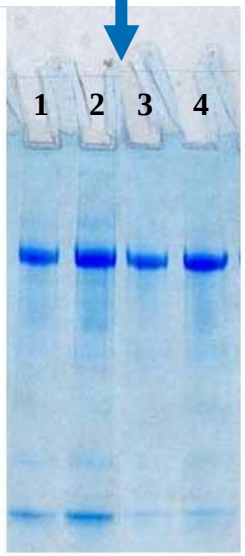
Production of neuraminidase



Step	% Purity	% Recovery
CIEX	7-15	90-100
SEC	≥ 80	60-70

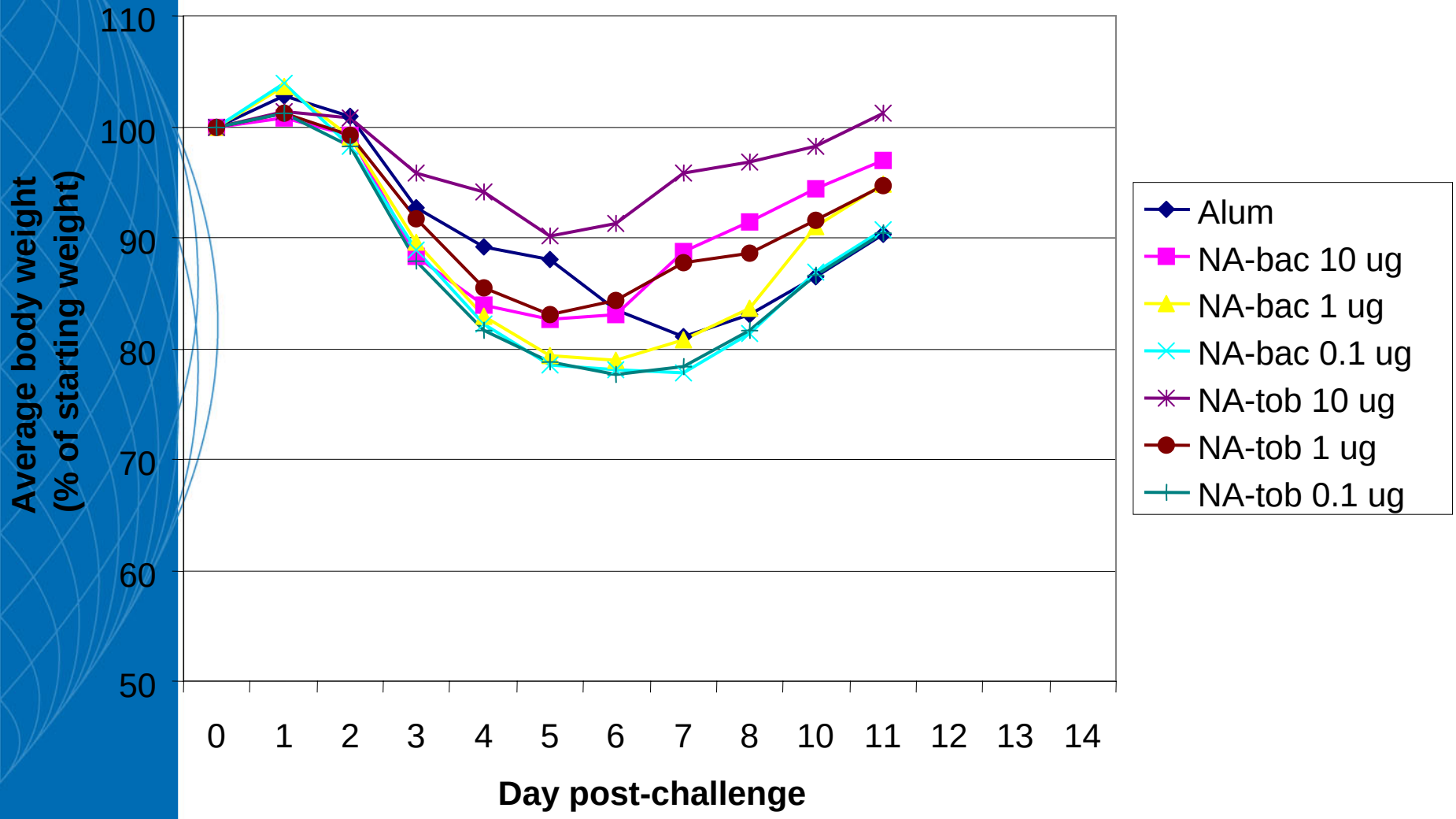


SDS-PAGE
1) Clarified extract
2) CIEX eluant
3) MW standards



Purity after the SEC step.
SDS-PAGE, non-reducing conditions, Coomassie-stained gel. Lanes 1-2: purification batch T170706, Lanes 3-4: purification batch T190706

Animal efficacy study – NA
Variations in body weight during viral challenge



2. Nutraceutique anticholestérolémiant

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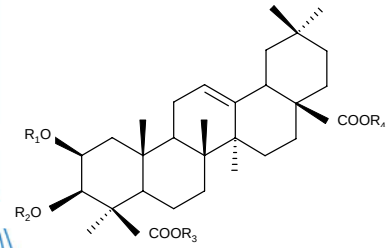
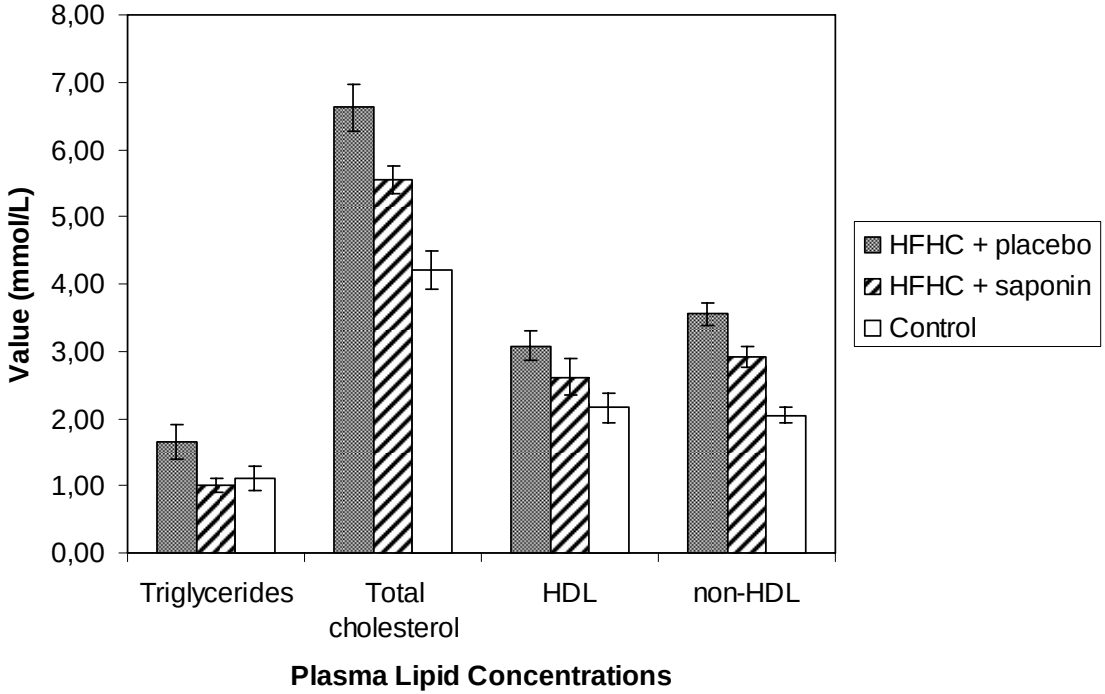
Med 205 treatment (75 mg/kg/d) on plasma lipid concentrations after 3 weeks





Med 205 mixed with food
Moderate hypercholesterolemic animal model

3. Enzymes cellulolytiques

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Drivers for Medicago

- Biofuels are attracting a lot of interest in North-America:
  - USA:
    - 35 billion gallons [132 billion litres] of renewable and alternative fuels [per year] in 2017 (20/10)
    - $150M in 2007 for the Biofuel initiative
  - CANADA:
    - 5% biofuel by 2010
    - $145M from Agriculture Canada in 2007

- First-generation biofuels from food crops such as corn and soybeans seen as not sustainable
- Second-generation biofuel = Cellulosic ethanol
  - Renewable cellulose sources or agricultural wastes
- But cellulases production remains a major bottleneck of cellulosic ethanol

Medicago's project

- Current technologies based on fermentation
  - high production cost = main limitation
  - negative impact on environment i.e. energy required
  - Fungal fermentation will not provide sustainable and cheap sources of cellulolytic enzymes

- US Department of Energy (DOE) working with Genencor and Novozymes to reduce production costs

Cost	**2000**	**2005**	**Target (2020)**
Enzymes	**5$/gal EtOH**	**0.2$/gal EtOH**	**0.03$/gal EtOH**
EtOH production	10$/gal	3$/gal*	0.80$/gal

* Twice as much as gasoline

Medicago's project

- Medicago's solution
  - Production of modified (patented) cellulases in transgenic alfalfa lines to develop a process compatible with alfalfa fractionation
  - Develop process with renewable cellulose sources
- Benefits
  - $0,05CAN/gallon target price achievable by 2010. This is 10 years ahead of fermentation technology
  - Environmental balance of production will be superior to fermentation

Project status

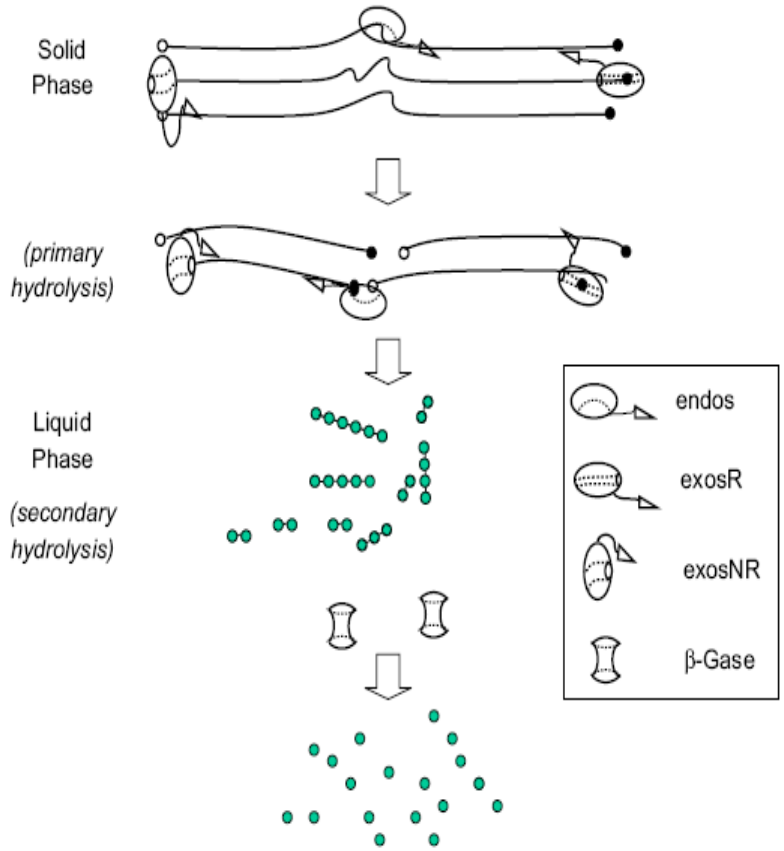

Fig. 2. Mechanistic scheme of enzymatic cellulose hydrolysis by *Trichoderma* non-complexed cellulase system.

- Demonstration with endoglucanase completed
- Exoglucanase and β-glucosidase ongoing

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http://www.medicago.com