Supporting innovation at the Geneva University Hospitals

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Full Professor, Medical Faculty, University of Geneva; Innovation Scientific Committee President, Geneva University Hospitals

13 December 2018
Quiz: Who was this innovator?

age 20-30
• leaves college because of bad grades; continues professional training at a bank
• founds a YMCA chapter in his native city
• creates an international company & starts wine-making at an unusual place

age 30-40
• manages to get an appointment with a head of state to discuss removal of trade restrictions
• sees something that makes him one of the great innovators of mankind

73 years
• receives Nobel Prize
Question 1

1. Who was this man?
   1. Albert Einstein
   2. Linus Pauling
   3. Wilhem Röntgen
   4. Henry Dunant
Question 2

1. What did he see?
   1. The structure of Vitamin C
   2. The first X-ray pictures
   3. The battle of Solferino
   4. The Universe through a high performance telescope
battle of Solferino (1859)

Henry Dunant
Geneva
1828-1901

Red Cross
Geneva Convention
No 1 University hospital in Switzerland
2’000+ inpatient beds
1’000’000+ outpatient consults
11’560 employees
180 professions

Medical Faculty, University of Geneva
# excellence in biomedical research
# strong international reputation
Geneva University Hospitals
Geneva Medical Faculty
& Switzerland

Some numbers about innovation
Innovation in Switzerland

LEADERS IN INNOVATION

GLOBAL INNOVATION INDEX 2018
ranks the innovation performance of
nearly 130 countries. Each country is
scored according to 80 indicators.
GLOBAL INNOVATION INDEX 2018
Energizing the World with Innovation
The secret of Swiss innovation 😊

![Graph showing the correlation between Nobel Laureates per 10 million population and chocolate consumption (kg/yr/capita)].

- Correlation coefficient: $r = 0.791$, $P < 0.0001$
What about Geneva?
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Scripps Research Institute (TSRI)</td>
<td>United States of America (USA)</td>
<td>18.15</td>
<td>1,520</td>
<td>763.6</td>
<td>3,795</td>
<td>40.1%</td>
</tr>
<tr>
<td>2</td>
<td>The Rockefeller University</td>
<td>United States of America (USA)</td>
<td>15.43</td>
<td>1,173</td>
<td>396.0</td>
<td>2,564</td>
<td>45.7%</td>
</tr>
<tr>
<td>3</td>
<td>Massachusetts Institute of Technology (MIT)</td>
<td>United States of America (USA)</td>
<td>9.48</td>
<td>8,114</td>
<td>2,473.0</td>
<td>22,688</td>
<td>35.8%</td>
</tr>
<tr>
<td>16</td>
<td>University of Strasbourg</td>
<td>France</td>
<td>5.97</td>
<td>2,023</td>
<td>289.7</td>
<td>8,124</td>
<td>24.9%</td>
</tr>
<tr>
<td>21</td>
<td>University of Geneva (UNIGE)</td>
<td>Switzerland</td>
<td>5.63</td>
<td>2,400</td>
<td>544.4</td>
<td>9,679</td>
<td>24.8%</td>
</tr>
<tr>
<td>34</td>
<td>University of Zurich (UZH)</td>
<td>Switzerland</td>
<td>5.24</td>
<td>2,485</td>
<td>536.9</td>
<td>10,576</td>
<td>23.5%</td>
</tr>
<tr>
<td>41</td>
<td>Swiss Federal Institute of Technology in Lausanne (EPFL)</td>
<td>Switzerland</td>
<td>5.14</td>
<td>3,383</td>
<td>1,070.1</td>
<td>10,607</td>
<td>31.9%</td>
</tr>
<tr>
<td>57</td>
<td>Swiss Federal Institute of Technology Zurich (ETH Zurich)</td>
<td>Switzerland</td>
<td>4.94</td>
<td>4,636</td>
<td>1,560.0</td>
<td>18,540</td>
<td>25.0%</td>
</tr>
<tr>
<td>61</td>
<td>University of Basel (UB)</td>
<td>Switzerland</td>
<td>4.90</td>
<td>1,236</td>
<td>478.1</td>
<td>7,340</td>
<td>16.8%</td>
</tr>
</tbody>
</table>
Innovation in the Geneva University Hospitals
Innovation needs at a large university hospital

- medical
- technical
- administrative
- human resources
- architecture
- environment
- ....
Innovation: topo down or bottom up?
Why bottom-up?

• quality of ideas and their implementation
  – people on the ‘front line’ identify the biggest opportunities for innovation.

• empowerment of collaborators
  – humans need to control the course of their live
  – lack of self determination as a reason for burn-out
Measures taken at the Geneva University Hospitals to facilitate innovation

- Innovation committee
  - innovation café
  - innovation day
  - ad-hoc meetings
- Innovation center
Results

• ~ 200 innovative projects followed by the innovation office since its creation:
  – invention disclosures
  – advice from experts
  – collaborations agreements, IP contracts (patents, licensing, technology transfer with UNITEC)
  – administrative support
  – ....
Cafés de l’innovation : programme 2015

Pourquoi ?
- Découvrir le monde de l’innovation au contact de professionnels du domaine
- Stimuler les discussions autour d’un thème d’actualité au cours d’une pause café

Quand: de 12h45 à 13h30 les derniers mardis du mois, de janvier à mai 2015
Où: salle 7A-6-741/742, 6ème étage des HUG

Mardi 27 janvier: « Technologie, citoyen et santé – Nouvelle donne »
Avec le Pr. Christian Louis, médecin-chef du service des sciences de l’information médicale (HUG) & département de radiologie et informatique médicale (Faculté de médecine, Université de Genève)

Mardi 24 février: « 2 jeunes en train de créer une start-up biomédicale: rapport du front »
Une petite capsule creuse de taille d’un cheveu pour remplacer la boîte de Petri, voilà le défi !
Avec Maxime Feyeux PhD, Département de pathologie et immunologie, Faculté de médecine et Kevin Alessandri, PhD, Département de Biochimie, Faculté des Sciences, Université de Genève

Mardi 31 mars: « Imprimantes 3D et patient virtuel : nouvelles technologies au service de la médecine dentaire »
Avec la Pr. Irena Sailer, responsable de la Division Prothèse Fixe et Biomatiériaux, Clinique Universitaire de Médecine Dentaire, Université de Genève

Mardi 28 avril: « Médias sociaux et web 2.0 à l’hôpital »
Avec Franck Schneider, responsable de la communication digitale des HUG et Serena Baldelli, spécialiste e-marketing à la direction de la communication des HUG

Mardi 26 mai: « Guérison de l’infection VIH par thérapie génique : défis pratiques et éthiques pour les premières études cliniques »
Avec le Pr. Bernard Hirschel, Président de la Commission cantonale d’éthique de la recherche
Innovation day

Call for abstracts; submitted abstracts will be screened by the innovation committee and selected for:

- Poster session
- Pitch session
- Innovation Academy
5 individual projects from the innovation day

- Infokids: handling waiting time for pediatric outpatients
- AKAN: above knee amputation prosthesis
- Mintaka Foundation: stop post-delivery bleeding in resource-limited countries
- Pharmelp: detection of counterfeit medicines in resource-limited countries
- How to clean an NMR machine
Handling waiting time for pediatric outpatients
AKAN: above knee amputation prosthesis

- allow distal weight bearing
- free the pelvis

• US: ~10'000 above the knee amputations per year. ~ 0.5 million individuals living above the knee amputation
• because of the small bone surface after above knee amputation, traditional prosthesis needs to be supported by the pelvis. This type of prosthesis however interferes with hip mobility.
Mintaka Foundation: stop postdelivery bleeding in resource-limited countries

• in developing countries, a large number of young women die or become seriously weakened because of uncontrolled bleeding after giving birth.
• a substantial fraction of this mortality and morbidity could be prevented by intravenous injection of oxytocin. However, oxytocin is unstable in warm climates and intravenous injection is often not possible.
• The innovators have formulated oxytocin in a dry, stabilized form which can be loaded into a robust, very inexpensive, disposable inhaler (collaboration with MannKind Corporation, US)
Pharmelp: detection of counterfeit medicines in emerging countries

- fake and low-quality pharmaceuticals kill more than 500,000 people a year
- the Geneva University Hospitals and School of Pharmacy, together with colleagues from Fribourg, are working on an affordable solution to identify counterfeit drugs.
- Low Budget Capillary Electrophoresis (ECB)
  - simple and robust analytical device
  - rapidly detects whether a drug is a counterfeit

2015: A capillary electrophoresis instrument (ECB) is now installed at the National University of Rwanda.
How to clean an NMR machine

before:

now:

Gain of time (650h/year)

better cleaning efficacy

ergonomic

now:

Guillaume Metenier
NMR technician
BLOCKCHAIN IN HEALTH CARE AND LIFE SCIENCES
USES IN BIOMEDICAL RESEARCH AND HEALTHCARE SUMMIT

Friday 30th November 2018
Centre de l’innovation, rue Alcide-Jentzer 17, 1205 Genève
Innovation in the Geneva University Hospitals

How can we go even further?
If we do not do anything, this is the typical innovation profile in a big enterprise

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>idea creators</td>
<td>5%</td>
</tr>
<tr>
<td>idea supporters and promoters</td>
<td>10%</td>
</tr>
<tr>
<td>idea killers</td>
<td>85%</td>
</tr>
</tbody>
</table>

“We only have two demands! Why don't people just give us what we want?”
What can be done to foster innovation in a big organization?

Create an innovation culture

• create enthusiasm for innovation
• implement tools, methods and programs that enable expression of innovative spirit.
• Toyota’s innovation culture increased the number of annual suggestions per employee 480-fold from 0.1 to 48
  – "accumulation of numerous small improvements becomes a revolution"
“Everyone can make a difference”

Bottom-up approach
Value what exists, look for synergies, not competition

Internal to HUG
- Innovation Scientific Committee
- Operational team and board of directors
- Patient-partnership platform
- Network of innovation specialists (UNITEC, legal, …)
- Financial resources (Private Foundation of HUG, subsidies…)
- Ambassadors in the various services and care units

Partnerships
- Local creativity and innovation actors: Fongit, Eclosion, Geneus, Venturelab, BioAlps, GCC…
- Foundations: Private Foundation of HUG, Swiss Foundation for Surgical Training and Innovation…
- Academia: Faculty of Medicine’s Translational Accelerator, CERN, UniGe
- Industry
Activities and events:
- Innovation day (every year)
- Innovation cafés,
- Hackathons (1-2 per year)
- Meet-ups, Training sessions, Thematic talks and many more...

Hackathons: 3 editions, 250 participants, 45 challenges, 144 hours of non-stop creativity!

Innovation day: 194 projects in 10 years, 42 awards
New commercialised products

- Gex-Finger
- AKAN - Above knee amputation nail
- Medacta International

New companies

- KYLYS
- Genkyotex
- AMAL Therapeutics

Technology Transfer Examples
OPERATIONAL TEAM

Innovation Center team:
Pr Antoine Geissbuhler
Aurélia Weber
Helena Bornet dit Vorgeat
Maurizio Ranieri

Contact:
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centre.innovation@hcuge.ch