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Development of myostatin inhibitory peptides for muscle atrophic disorders

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Delegation of the European Union to Japan, Tokyo

JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE
日本学術振興会

東京薬科大学
Tokyo University of Pharmacy and Life Sciences

Focus on research

My research at TUPLS: myostatin inhibition

- Myostatin: protein responsible for **negative regulation** of muscular growth

- Natural deficiencies exists (cattle, whippets, sheep, humans)

”Belgian blue” cattle

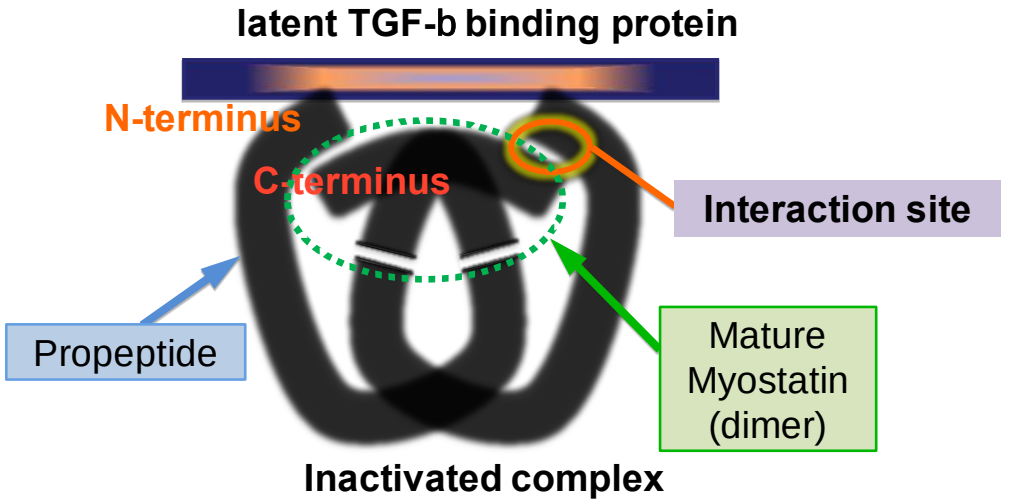
”Bully” whippet

Focus on research

The idea: synthesis of myostatin inhibitory peptides

- Myostatin inhibition in vivo: inactivation of myostatin dimer by N-terminal part

➢ Synthesis of small peptides to inhibit myostatin ?



Myostatin inhibition

Muscle size increase ?

Focus on research

The results (so far): does it work?

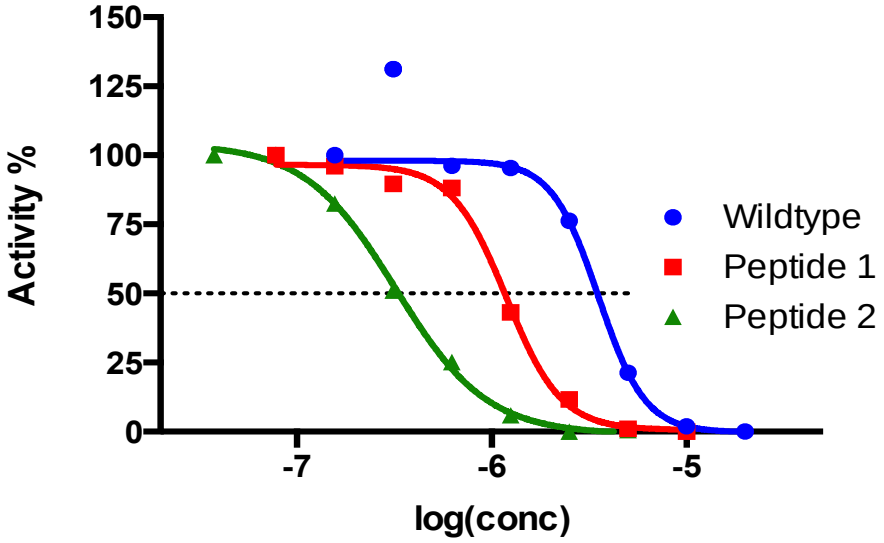
Mouse myostatin prodomain sequence

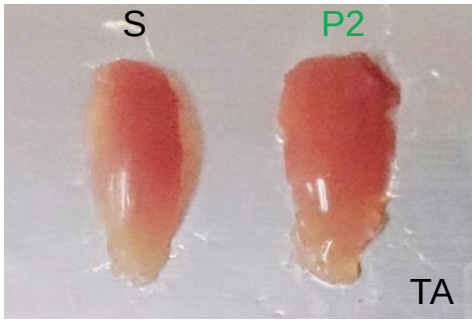
--AWRQNTRYSRIEAIKIQILSKLRLETA-

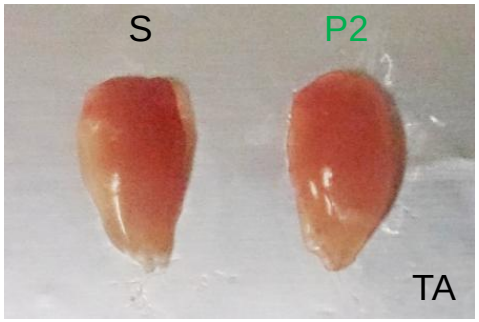
Myostatin inhibitory peptide **A** (23AA)

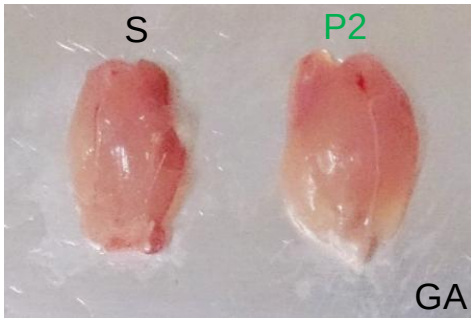
21 43

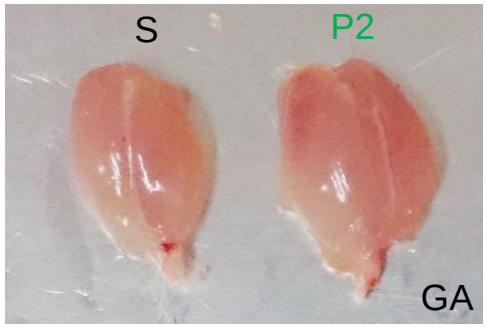
H-WRQNTRYSRIEAIKIQILSKLRL-NH_2











IC_{50} = 3.53 ± 0.25 µM

IC_{50} = 1.19 ± 0.11 µM

IC_{50} = 0.32 ± 0.05 µM

➢ **11 times lower !**

Preliminary *in vivo* studies on mice: Peptide 2 can increase the muscular mass to **up to 20%.**

Focus on career

(Relatively) successful in Europe

- Jul. 2011 – Sep. 2015: Ph.D. in Chemical Biology (University of Cergy-Pontoise, France & University of Florence, Italy)
- Oct. 2014 – Aug. 2015: Temporary Assistant Professor (UCP)
- Feb. 2016: Qualified as Assistant Professor in France (organic chemistry, chemical biology and biochemistry)
- Dec. 2016: Ph.D. award “Louis Forest” (from Paris Universities Chancellery)

Focus on career

Japan? Why, and how?

Age 8

Age 18

Age 28

?

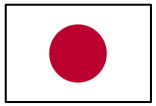
Age 38

- Obtained position through **networking**

- Oct. 2015 – Sep. 2016: MEXT Postdoctoral Researcher (Tokyo Univ. of Pharmacy and Life Sciences, Hachioji, Japan)
- Oct. 2016 – present: JSPS Overseas Researcher (TUPLS)

Researcher in Japan

Despite some drawbacks…

- Language:  vs 
  - ➢ Both sides must **improve their language skills**

- Communication: non-conflictual Japanese culture
  - ➢ Importance of **non-verbal** or **indirect** communications

- Efficiency: the work schedule & rhythm is different
  - ➢ Find a **work/life balance** satisfying everyone

- Being a “gaijin”…
  - ➢ People automatically assume you **know nothing**…

Researcher in Japan

… there are still positive points !

- Salary: 

➢ Great for starting a life as a young researcher

- Quality of life: a society full of (convenient) services

➢ Allows to **stay focused** on the work

- Self-esteem: bringing something different to the group

➢ The work is **valorized** because **unique**

- … being a “**gaijin**” !

➢ … so **tolerance** is higher than usual (don’t abuse it!)

The future

Academia vs Industry

- Academia:

✓ Teaching to students
✓ Less pressure (vs industry)
✓ Choice of the topic

❖ Language is an issue
❖ Academic system “flawed”

- Industry:

✓ More money (salaries, lab…)
✓ Start-ups !
✓ Vitality of the field (in pharma)

❖ Tight schedules and turnover
❖ Corporate system

➢ **Things are not set in stone…**

The future

From Japan back to Europe

- A valuable experience: **Transferable skills** for future career

- ✓ Group thinking: Interests of **the group** before your own
- ✓ Commitment: Learn to be **dedicated** to an objective
- ✓ Flexibility: Adapt to a **different culture**

The future

The realistic options

- ✓ Assistant professor: **France** (language barrier)
- ✓ Full-time researcher in academia: **Japan** (higher $$)
- ✓ Full-time researcher in industry: **Japan** or **France** (based on $$)
- ✓ Start-up in pharma or biotech: **Japan** or **France** (buisness laws?)

- ➢ Note: **Other EU countries** might also be an option

Conclusion

Life of an EU researcher in JP

- ✓ Working in Japan: an incredible opportunity
- ✓ Cultural differences: a lot to learn
- ✓ Building a successful international profile
- ➢ <u>The most important:</u> **Enjoy your time in Japan**

<u>Thank you for your kind attention !</u>