



# Effect of cod trypsin on rhinovirus 1A infectivity

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## Aims

- Anti-pathogenic activity of cod trypsin against rhinovirus *in vitro*
- Characterization of novel cod trypsin isoforms



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## Introduction – Cod trypsin

- Cod trypsin is a cold-adaptive serine-protease extracted from North-Atlantic cod (*Gadus morhua*) that cleaves proteins at the carbonyl side of arginine and lysine
- Studies have demonstrated that formulations containing cod trypsin have anti-pathogenic properties



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## Introduction - Rhinovirus

- The common cold is an upper respiratory tract infection (URI) caused by several viruses including the Human Rhinovirus (HRV)
- Positive-sense single-stranded RNA virus
- The HRV viral genome produces 11 proteins, four of which are capsid proteins VP1, VP2, VP3 and VP4



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## Introduction - Rhinovirus

- These proteins have numerous cleavage sites for proteases such as trypsin

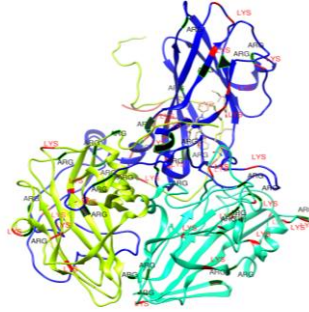


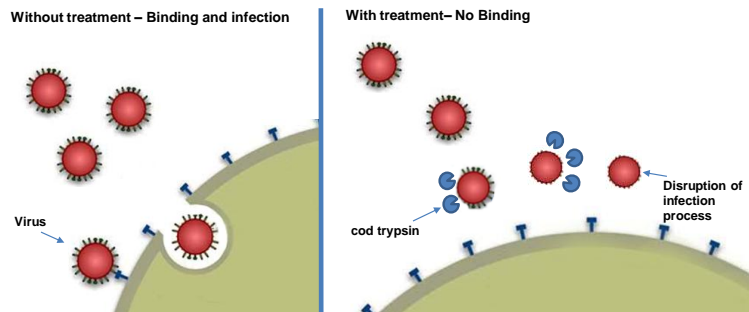
Figure 1. Structure of VP1 capsid protein shown with highlighted lys and arg.



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## Proposed mechanism



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## Method

- RD cells were grown in 96-well microtiter plates
- Rhinovirus was treated with cod trypsin
  - 16 or 32 U/mL
- Benzamidine used to inhibits trypsin activity
- Cells where infected with treated rhinovirus 1A
- Positive and negative controls



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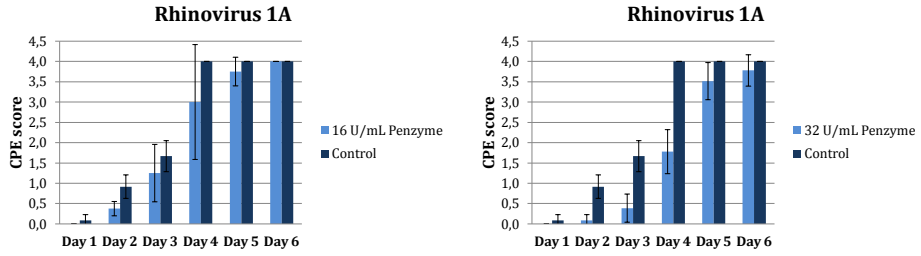
## Readout

- Cytopathic effect (CPE) score
  - where 0 is no infection and 4 is fully infected

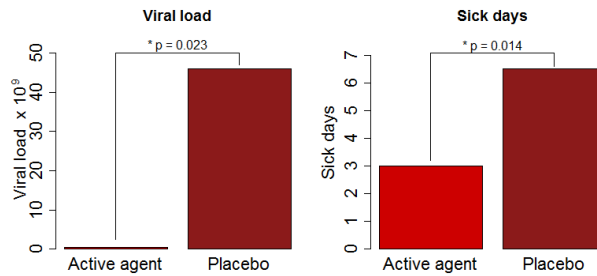


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## Results



## Clinical trial





## Conclusion

- Cod trypsin treatment shows dose dependent delay in rhinovirus 1A infection
- This suggests that cod trypsin can be used to prevent or decrease severity of rhinovirus infections in humans



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## Future work

- Determine the TCID<sub>50</sub> effect of cod trypsin
- Test the effect of natural additives in combination with cod trypsin
- Characterize novel cod trypsin isoforms



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## Acknowledgment

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## Thank you

Questions?



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