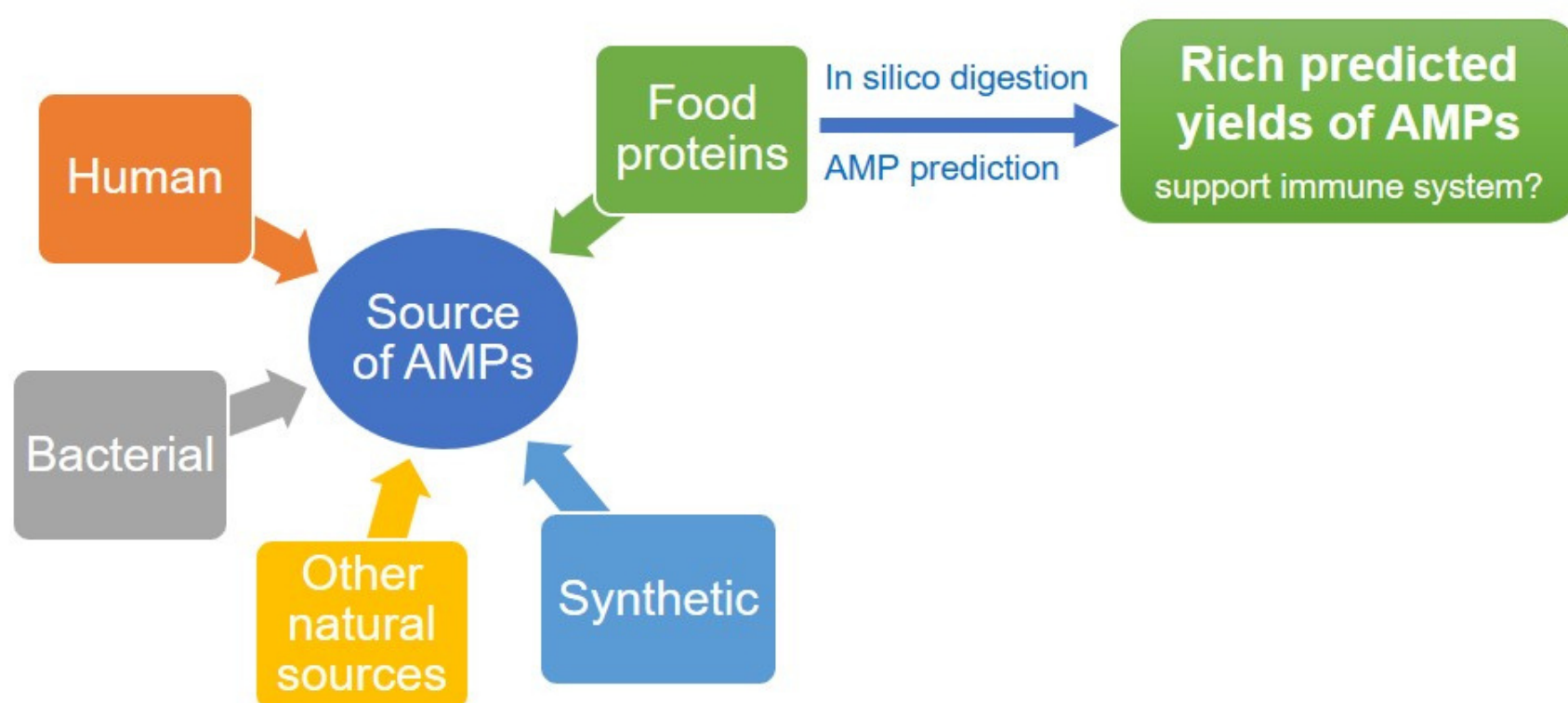


# Comparative yields of antimicrobial peptides released from food proteins estimated by in silico methodology

Feijie Li, Milton T. Hearn, Lisandra L. Martin, Louise E. Bennett  
 School of Chemistry, Monash University,  
 Clayton, Victoria, 3800, Australia

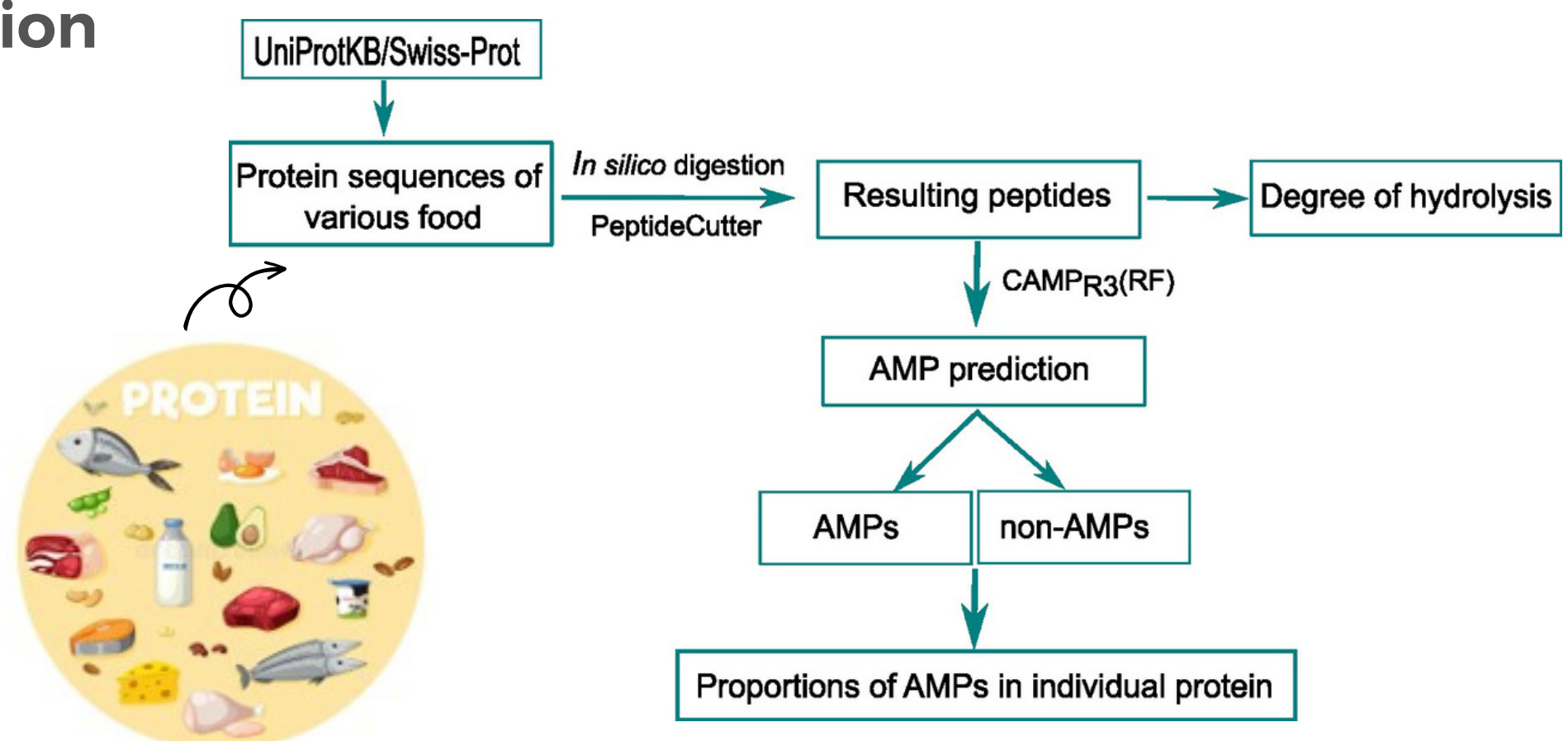
✉ feijie.li@monash.edu  
 louise.bennett1@monash.edu



- Endogenous antimicrobial peptides (AMPs) play a crucial role in the host's innate immunity.
- Food proteins encrypt AMPs, that can be released by digestion, and may also support host defence.
- The bioactive contribution of 'passive' food-derived AMPs to the pool of endogenous AMPs has not been specifically evaluated.
- In silico tools enable theoretical studies of protein digestion and AMP prediction.
- The research aim was to use in silico methods to estimate the yields of AMPs encrypted in various food proteins.

## In silico digestion and prediction

- Major proteins in popular foods were selected.
- The protein sequences obtained from UniProtKB/Swiss-Prot were digested by PeptideCutter.
- The AMP activity of resulting peptides (>4 amino acids) was predicted with the CAMPR3-RF tool.
- The proportions of AMPs in individual proteins were calculated.



## AMP yields in different food proteins

Table 1. Degree of hydrolysis (Dh) following in silico digestion from selected food proteins.

ID	Food source	Protein name	Dh (%)	ID	Food source	Protein name	Dh (%)
1	Pig, cow, chicken	Actin-alpha	28.5	6	Soy	Glycenin 1	30.4
2	Cow milk	α-S1-casein	31.5	7	Peanut	Vicilin	31.7
3	Cow milk	Lactoferrin	36.4	8	Spinach	Rubisco	34.2
4	Salmon	Actin	28.6	9	Wheat	Gliadin	19.9
5	Chicken egg yolk	Ovalbumin	31.2	10	Almond	Amandin	30.4

- Mass yields of AMPs from food proteins ranged from 2 to 12%.
- Vicilin from peanut (7), amandin from almond (10) were predicted to contain relative higher mass yields of AMPs than others.

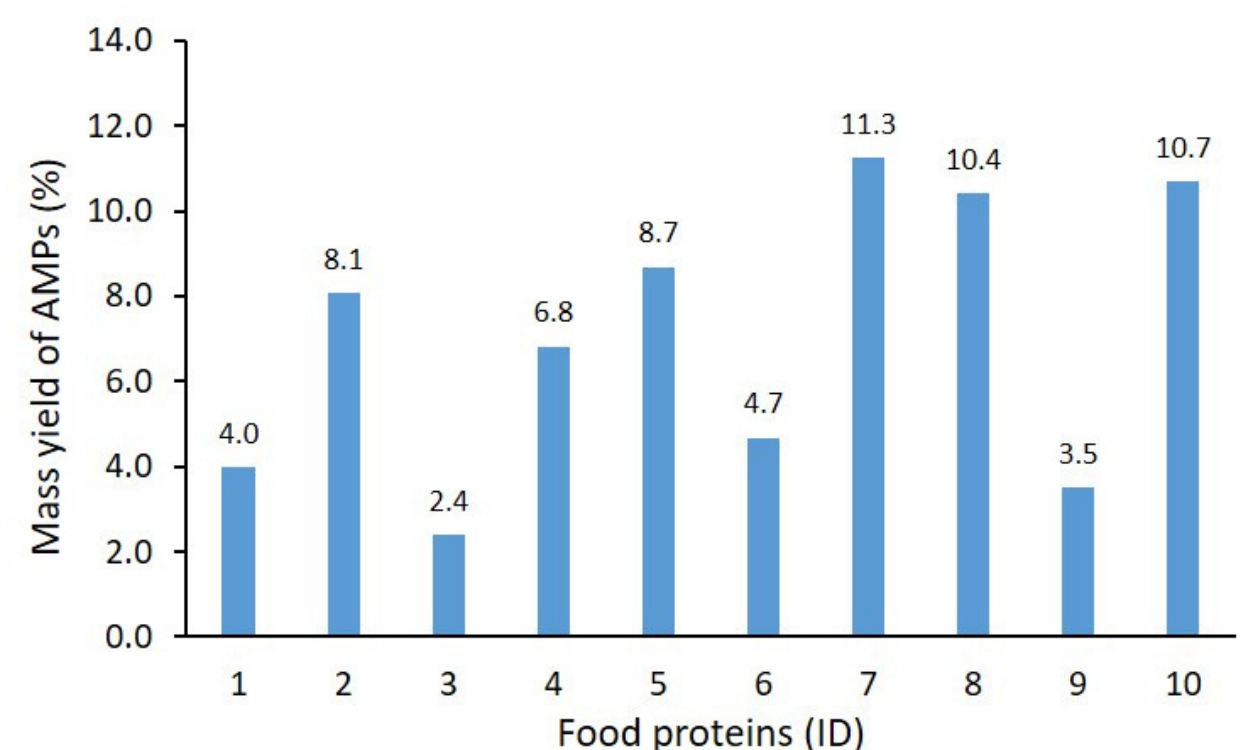


Figure 1. Mass yield of peptides designated as AMPs by the CAMPR3(RF) prediction reported by mass, identified from selected food proteins.

## Conclusion

- Based on in silico predictions, food proteins contain significant proportions of AMPs, that can be released by digestion.
- Considering the regular intake of dietary protein and potential for effective AMP release, this research implicates a role of 'passive' dietary AMPs in conjunction with the pool of gene-regulated AMPs, for supporting the innate immune system to manage microbial infection.