Priming of porcine γδ T-cells with condensed tannins: effects of tannin structure and polymer size

Andrew Williams, Kirsten Reichwald, Christos Fryganas*, Irene Mueller-Harvey*, Stig Thamsborg

IVS, KU-SUND, Denmark
*University of Reading, UK

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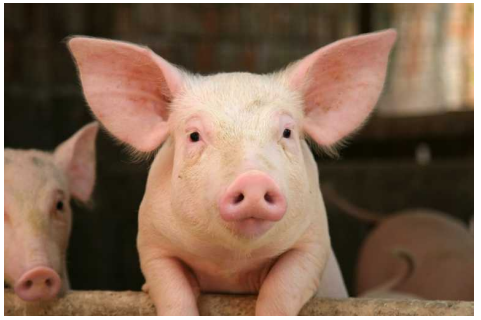
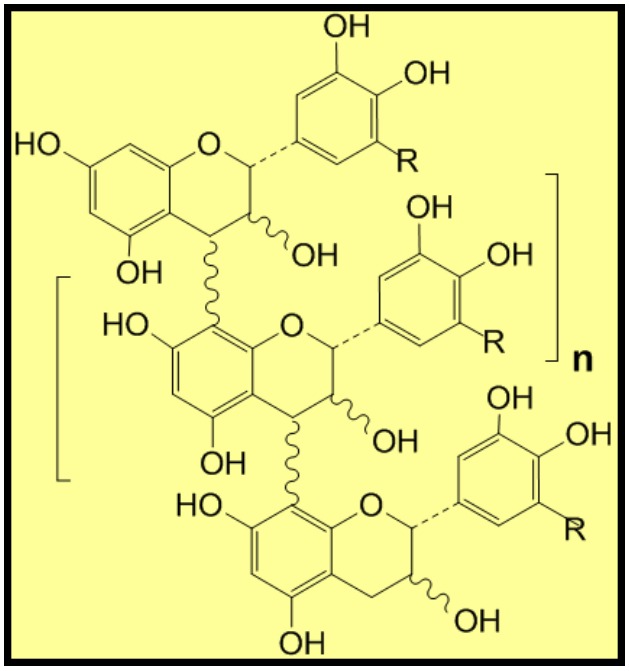


Our research group:

- Focuses on novel strategies to control infections in livestock, particularly parasites
- Emphasis on interactions between diet, immunity and infection
- Natural dietary compounds that kill pathogens and stimulate host immunity

Plant secondary metabolites

Condensed tannins



Immune-stimulating effects of tannins…

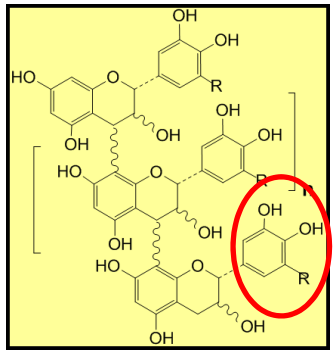
The Journal of Immunology

Select Plant Tannins Induce IL-2Rα Up-Regulation and Augment Cell Division in γδ T Cells[1]

Jeff Holderness,* Larissa Jackiw,* Emily Kimmel,* Hannah Kerns,* Miranda Radke,* Jodi F. Hedges,* Charles Petrie,† Patrick McCurley,† Pati M. Glee,† Aiyappa Palecanda,† and Mark A. Jutila[2]*

Objectives of this study

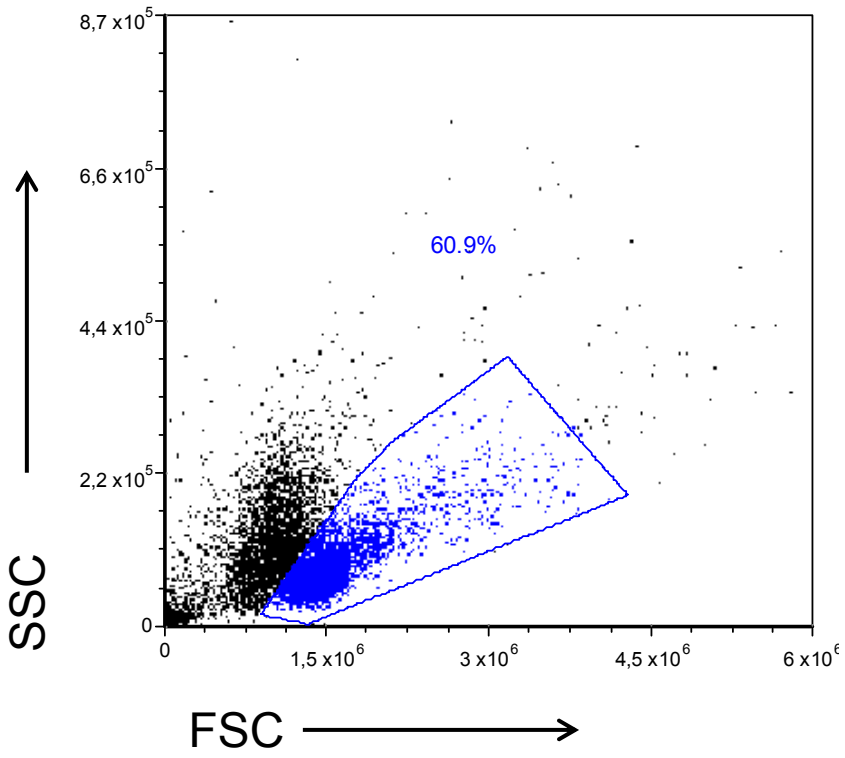
- Determine condensed tannins are agonists for porcine γδ T cells
- Determine if the degree of poylermization influences this priming effect
- Determine if tannin fine structure influences the priming effect

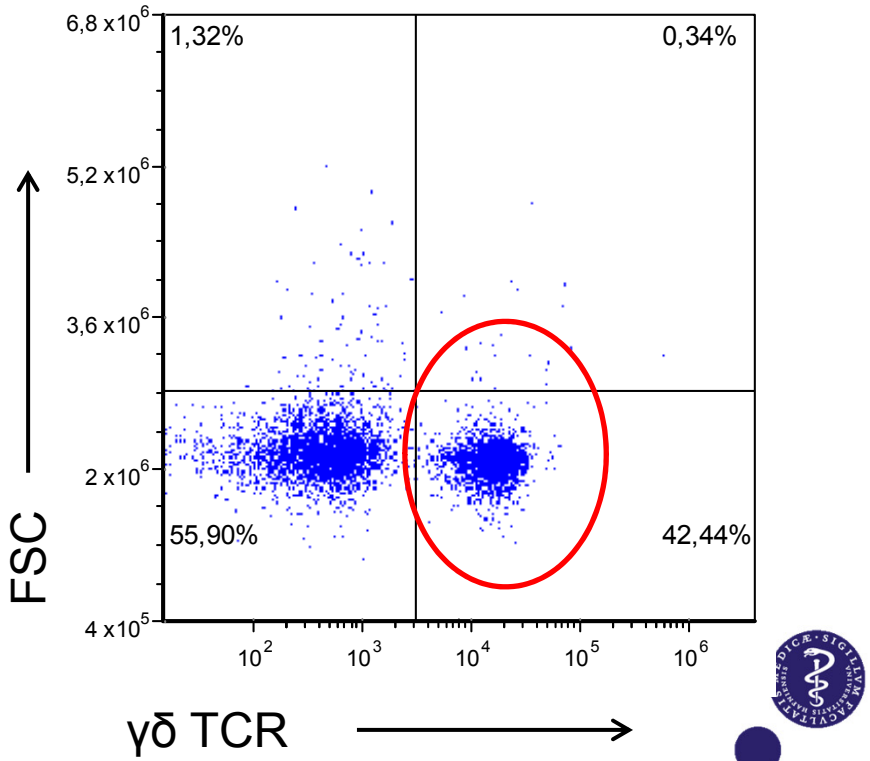


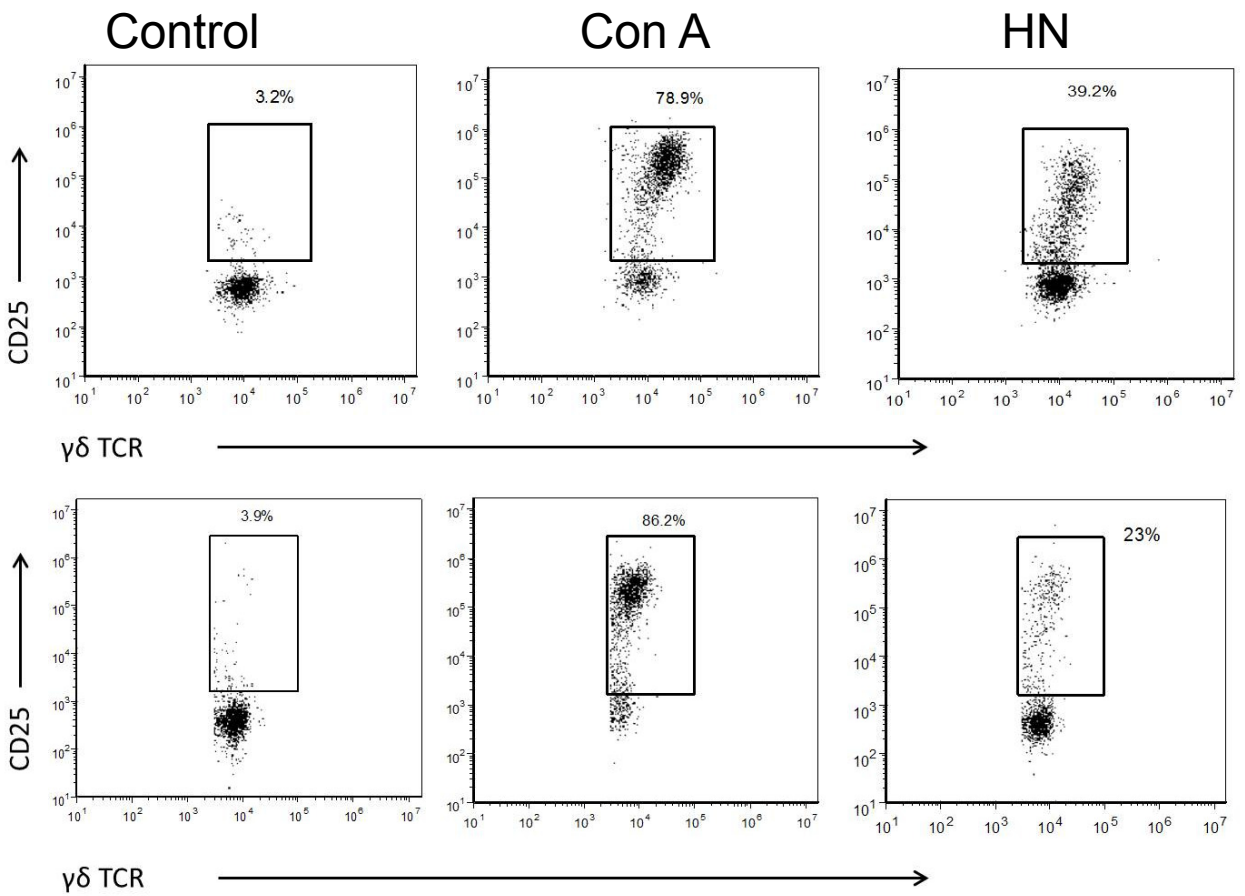
Study design

- Tannin extraction and fractionation
- PBMC isolated from porcine blood and incubated for 48 hours with the tannin fractions
- Stained with anti- γδ TCR and anti-CD25 and analysed by flow cytometry

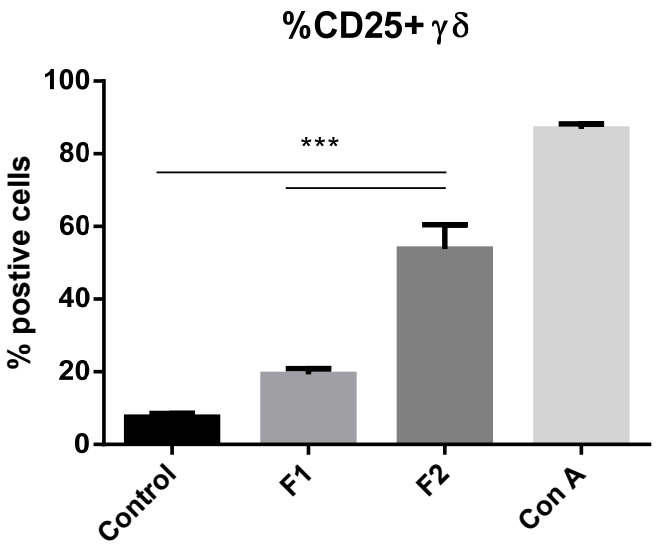
Results

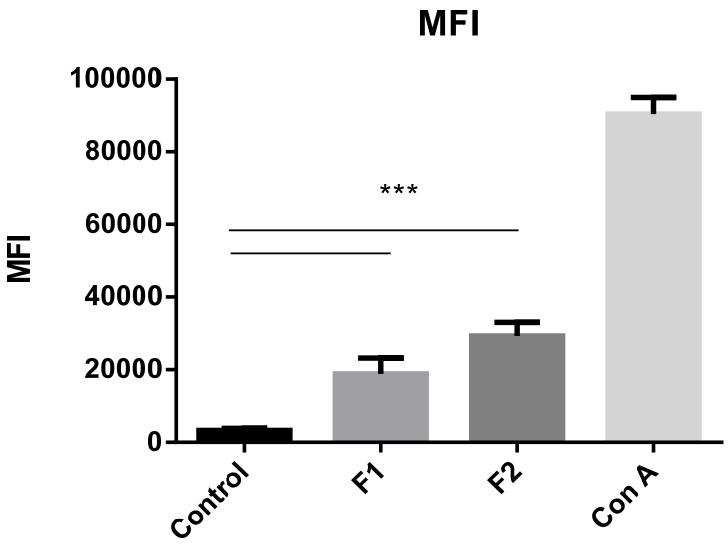

8,7 x10^5
6,6 x10^5
4,4 x10^5
2,2 x10^5
0
60.9%
SSC
0
1,5 x10^6
3 x10^6
4,5 x10^6
6 x10^6
FSC


6,8 x10^6
5,2 x10^6
3,6 x10^6
2 x10^6
4 x10^5
1,32%
0,34%
55,90%
42,44%
FSC
10^2
10^3
10^4
10^5
10^6
γδ TCR

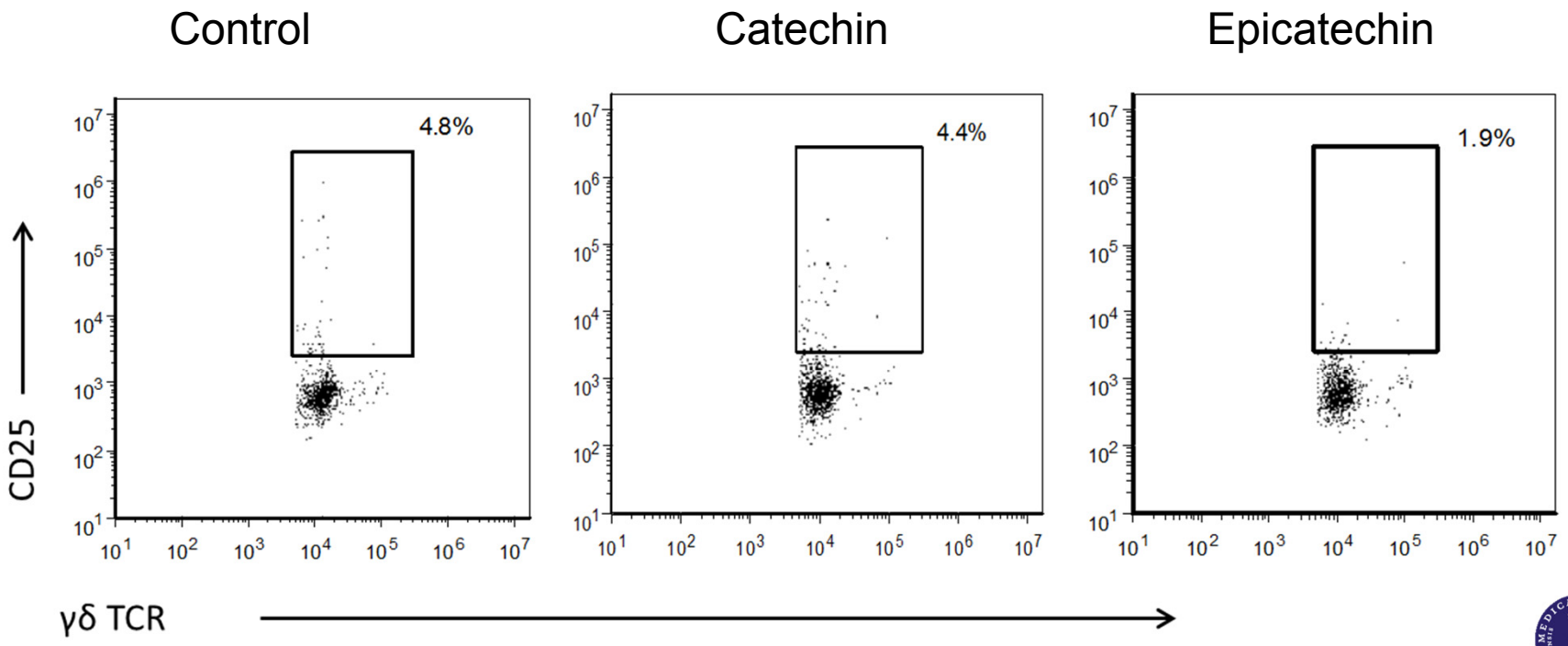

Control
Con A
HN
3.2%
78.9%
39.2%
CD25
γδ TCR
Fraction 2
3.9%
86.2%
23%
CD25
γδ TCR
Fraction 1

Results

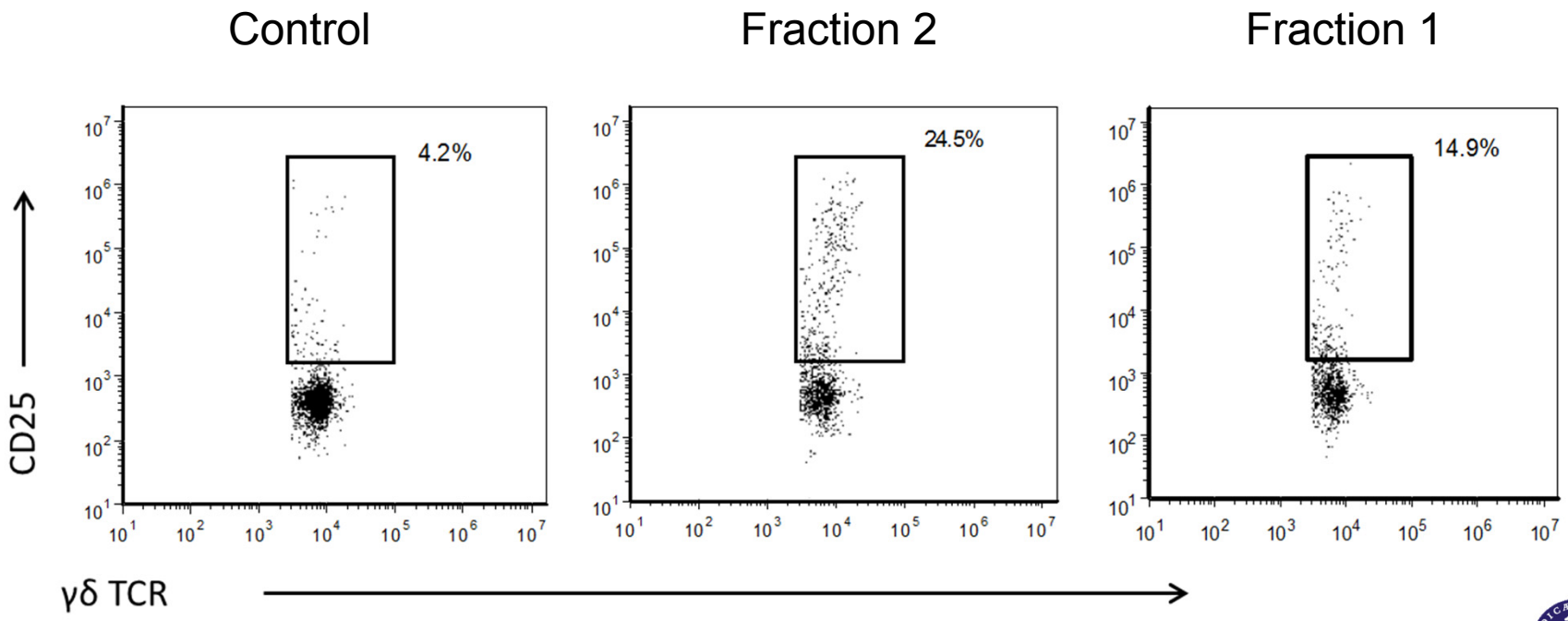

%CD25+ γδ
% postive cells
100
80
60
40
20
0
***
Control
F1
F2
Con A


MFI
MFI
100000
80000
60000
40000
20000
0
***
Control
F1
F2
Con A

Results



Results



Conclusions so far…

- Tannins are an effective agonist for porcine γδ T-cells
- Priming only evident with polymeric tannins, and not monomeric units. Potency increases with degree of polymerisation.
- Both PC and PD type tannins can induce priming

Further work

- *In vivo* studies
- Functional assays with T-cells and dendritic cells to assess whether tannins influence responses to pathogenic antigens

Thank you

DET FRIE FORSKNINGSRÅD
DANISH COUNCIL FOR
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Marie Curie Initial Training Network