

Investigating enzyme catalytic mechanisms with neutrons:

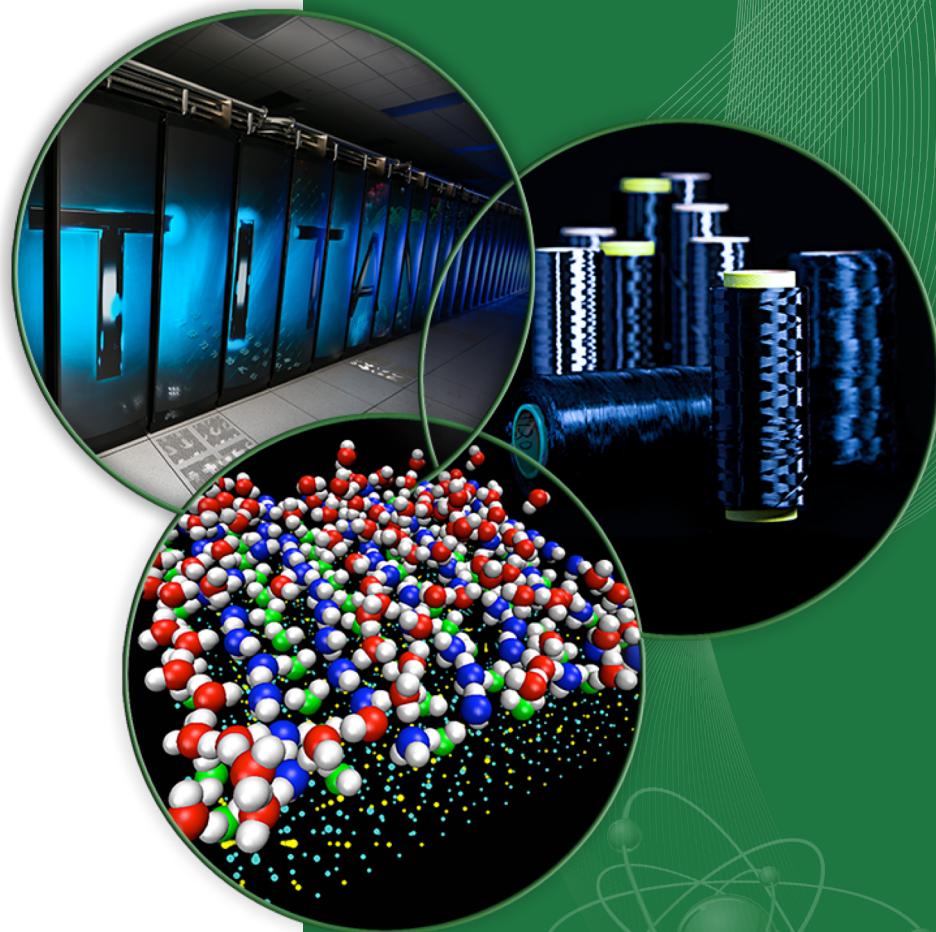
# Tautomerization by the mammalian cytokine MIF

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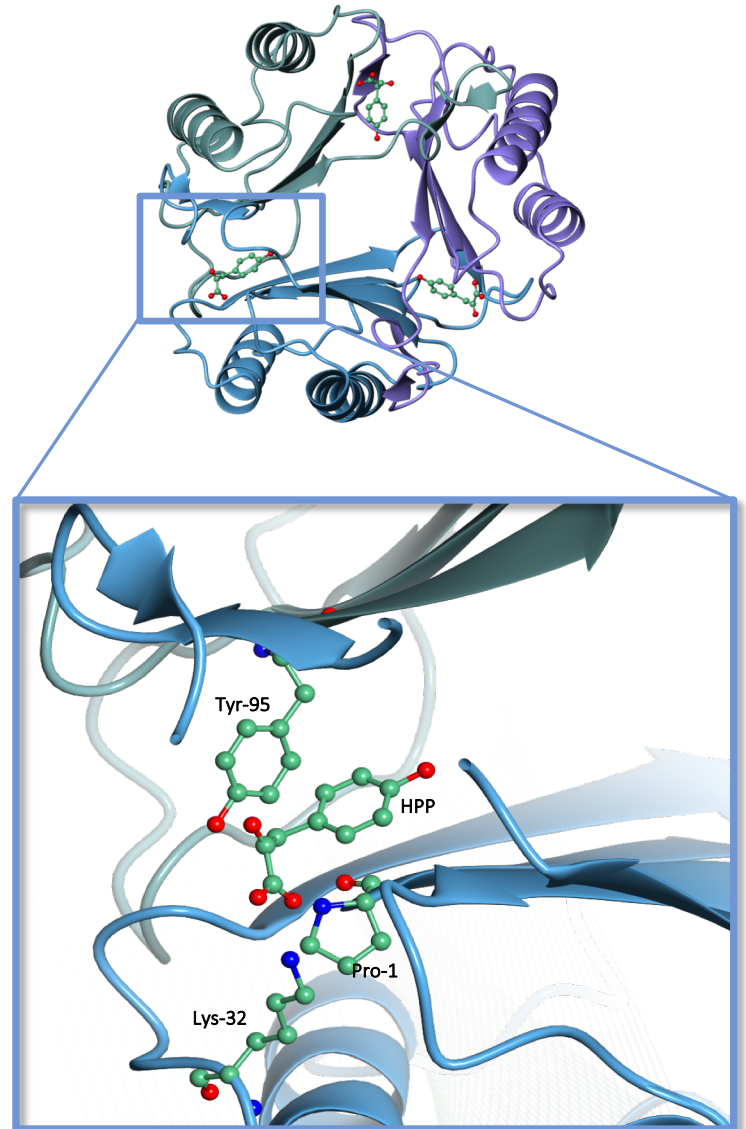
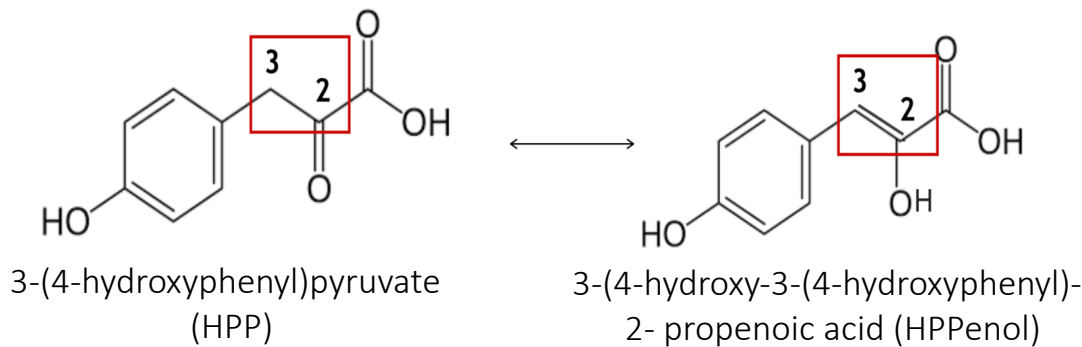
Neutron Day  
April 26, 2018

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# Macrophage migration inhibitory factor (MIF)

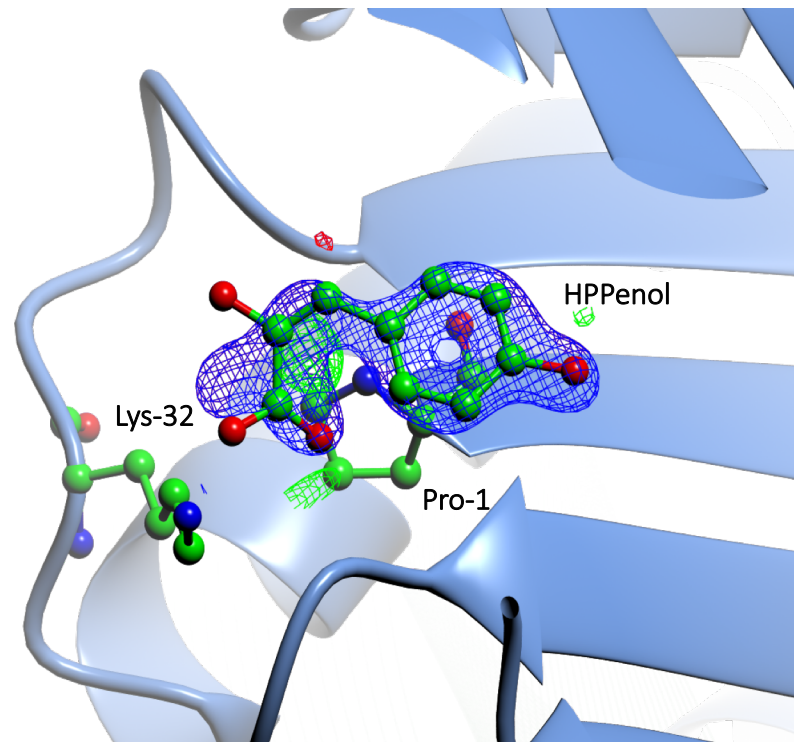
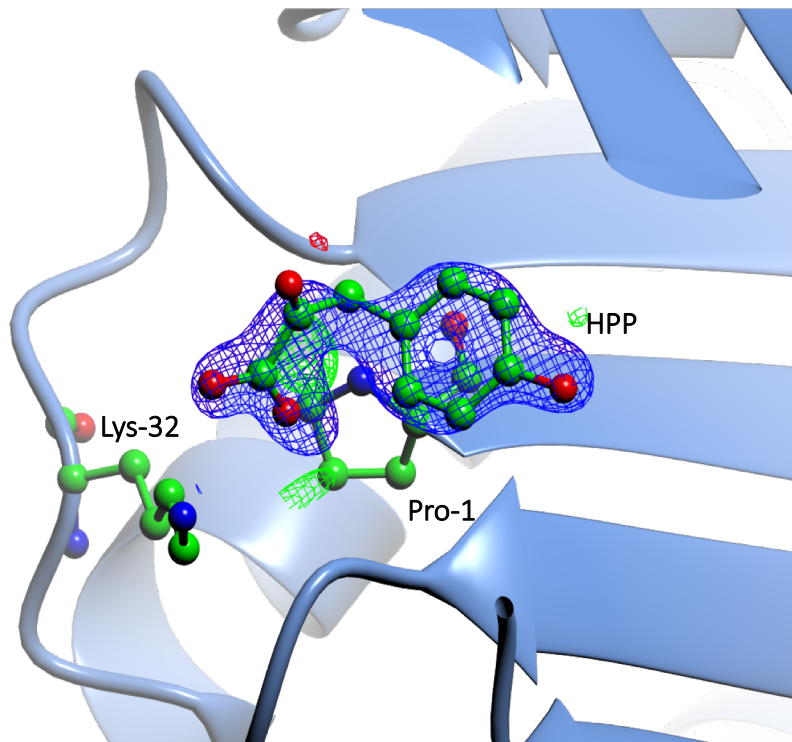
- Pro-inflammatory cytokine with enzymatic activity
- Regulates immune system and inflammatory response
- Implicated in diseases such as septic shock, autoimmune disease and a number of cancers
- Forms homotrimer active sites located between the trimer subunits
- Converts the ketone (HPP) to the enol (HPPenol)



# HPP Tautomerization

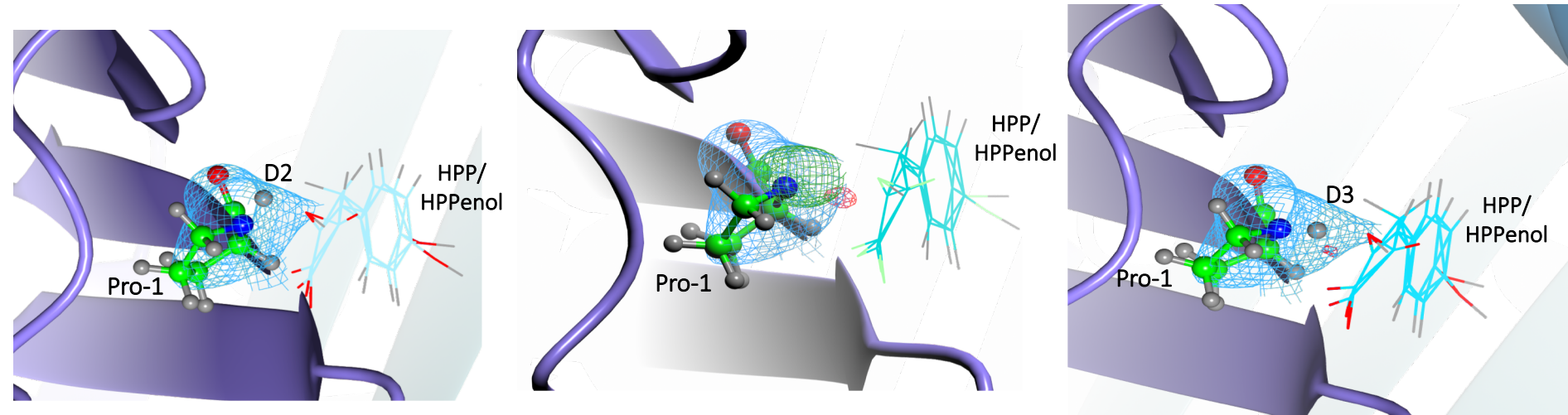
Key catalytic residues:

- Pro-1 abstracts hydrogen from C3
- Lys-32 stabilizes the carboxylic group of HPP

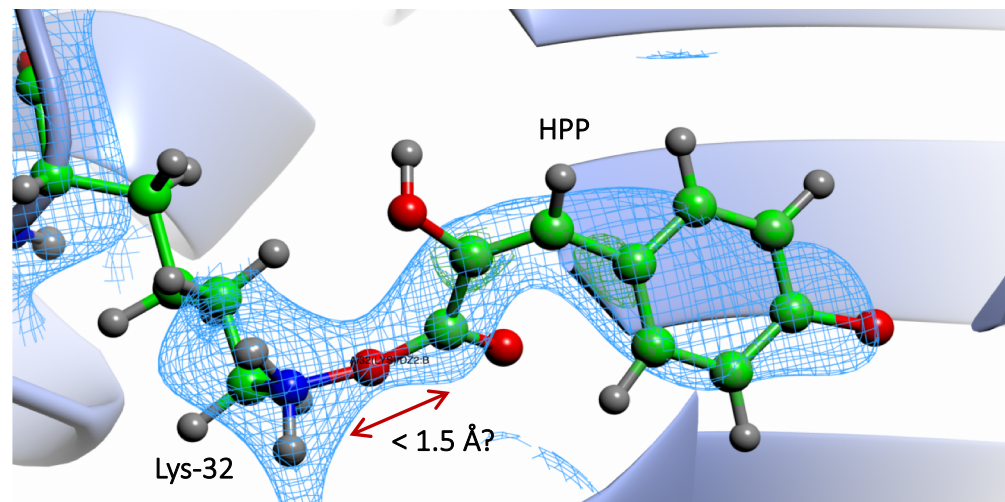


# Neutron structure of the MIF active site

- Neutron diffraction data suggest that Pro-1 is protonated



- Lys-32 can be positioned in close proximity to the carboxylic group of HPP



Thank you for your attention.  
Questions can be addressed to me at the poster session.

# Acknowledgements

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