NC STATE UNIVERSITY

Comparative Medicine Institute

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Biology and applications of CRISPR-Cas immune systems

Research emphasis:

The CRISPR lab is focusing on the evolution and functions of CRISPR-Cas systems, and their use for bacterial genotyping, building prokaryotic immunity, and Cas9-mediated genome editing in lactic acid bacteria used in food manufacturing. Our lab is developing next-generation probiotics and starter cultures to enhance human health and food products, using functional genomic approaches.

Application:

- Genotyping of bacteria
- Phage resistance
- CRISPR-based genome editing in bacteria
- CRISPR-based antimicrobials

Collaboration potential:

- Exploitation of CRISPR-Cas systems
- Altering the composition of animal GIT

Selected publications:

Selle K, Klaenhammer TR, Barrangou R (2015) CRISPR-based screening of genomic island excision events in bacteria. Proc Natl Acad Sci U S A 112:8076-81

Beisel CL, Gomaa AA, Barrangou R. (2014) A CRISPR design for next-generation antimicrobials. Genome Biol 15:516

Briner AE, Donohoue PD, Gomaa AA, Selle K, Slorach EM, Nye CH, Haurwitz RE, Beisel CL, May AP, Barrangou R. (2014) Guide RNA functional modules direct Cas9 activity and orthogonality. Mol Cell 56:333-9

Barrangou R. (2012) RNA-mediated programmable DNA cleavage. Nat Biotechnol 30:836-8.