Innate local host response of multicellular organisms

Antimicrobial peptides

Small cationic, amphophilic peptides (15-50 amino acids)

Microbicidal activity against both bacteria and fungi

Classification of antimicrobial peptides according to structural features

Structural features	Examples	Species
Amphophilic α–helix, without Cys residues	Cecropins, Magainins LL-37 CAP18	Insects, pigs Frogs Humans Rabbits
Extended α-helix, free of Cys residues	Apidaecins Drosocins Bac-5 Bac-7 Indolicin PR-39	Insects Insects Hoofed mammals (cattle, sheep, goats) Hoofed mammals (cattle, sheep, goats) Cattle Pigs
Loop structure with one intramolecular disulfide bonds	Brevinins Esculentin Bactenecin	Frogs Frogs Cattle
β-sheet structure, with 2 or 3 intramolecular disulfide bond	α-defensins β- defensins Protegrins Tachyplesins Insect defensins	Humans, rats, guinea pigs, rabbits, Humans, cattle, mice Pigs Crabs Insects

Structural features:

- 30-40 amino acids
- Molecular weight = 3-4 kD
- 6 cystein residues from 3 intramolecular bond
- Triple-stranded antiparallel β-sheet

- Typical spacing between the 6 cysteine residues
- Disulfide bond pattern

α-defensins:
HPN-1, HPN-2*, HPN-3, HPN-4, HD-5, HD-6

β-defensins:
HBD-1, HBD-2, HBD-3, HBD-4,

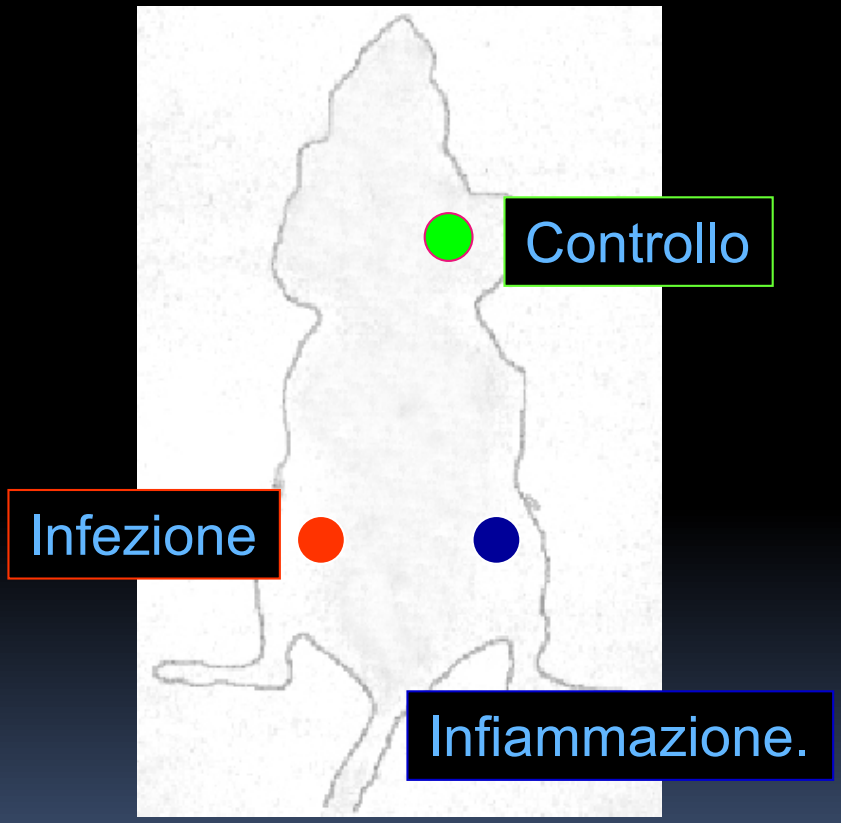
θ-defensins

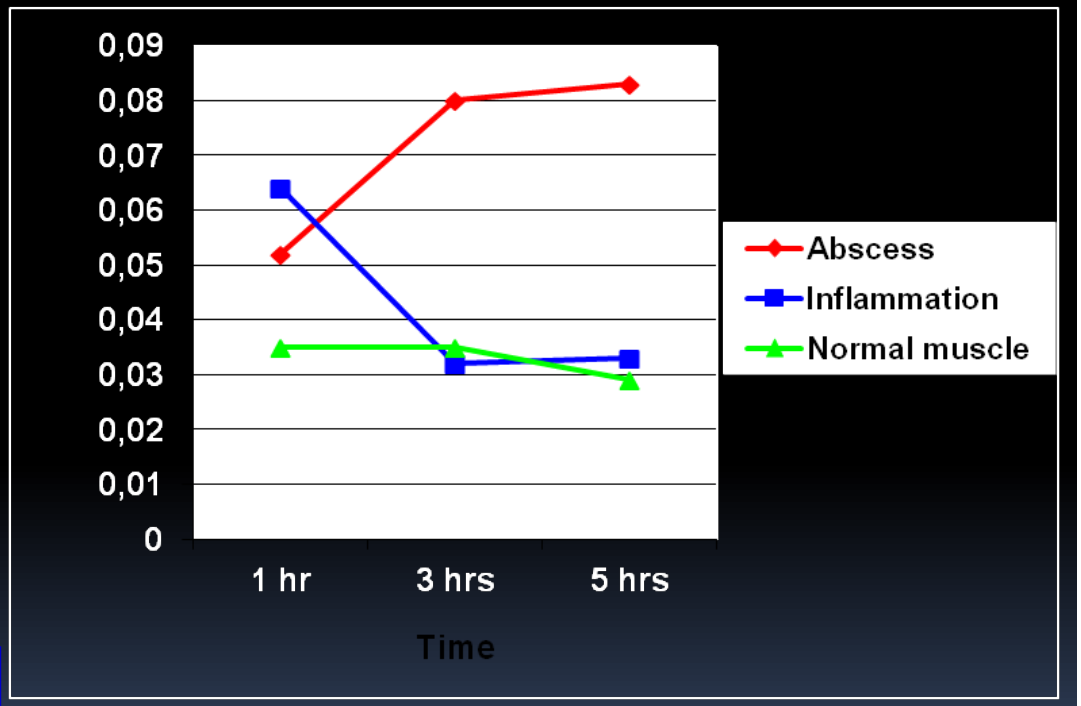
In solution, α and β-defensin share a similar three-dimensional structure

*truncated human α-defensin

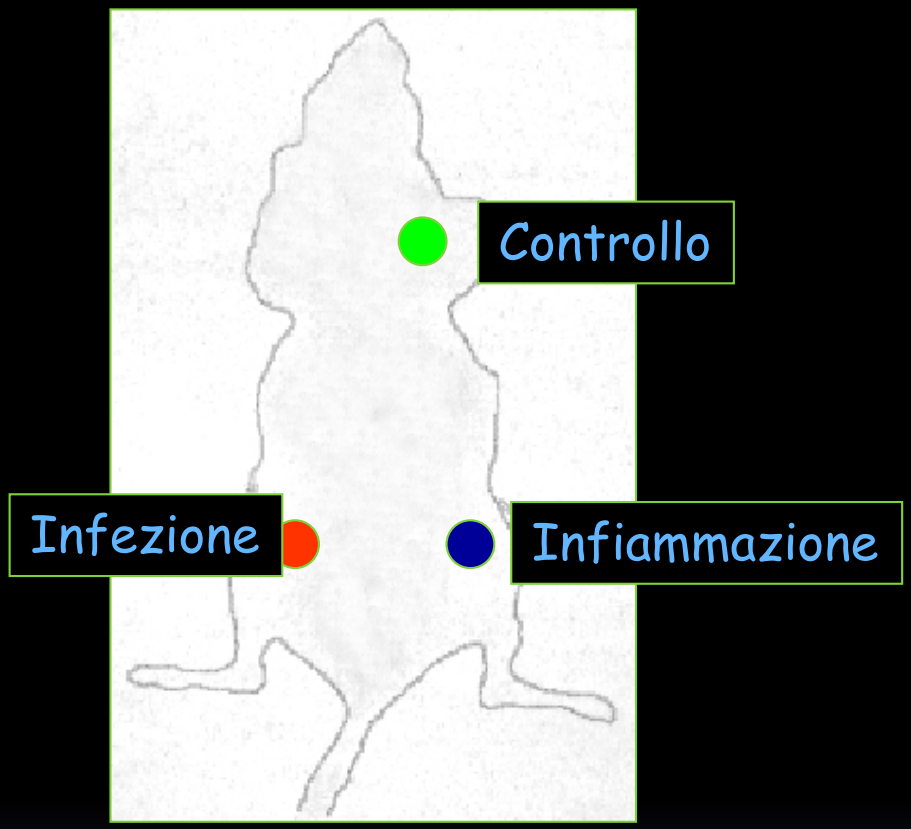
La defensina umana β-3 è un peptide antimicrobico non-emolitico di 4-kDa dotato di attività antimicrobica dovuta alla sua capacità di indurre lesioni nella membrana cellulare di batteri Gram-positivi e Gram-negativi.

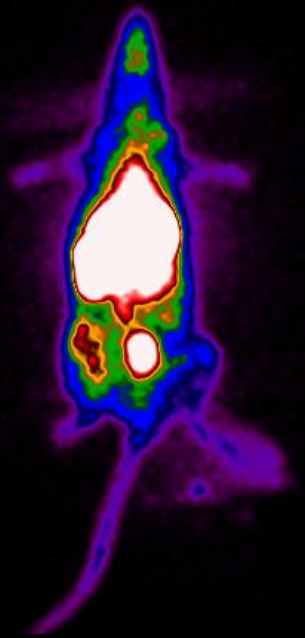
Questo peptide, marcato con 99mTc ha già dimostrato di essere in grado di distinguere, in modelli animali, le infezioni dalle infiammazioni in studi «ex-vivo».





Analoghi risultati sono stati ottenuti mediante studi "in vivo" con lo stesso modello sperimentale.





Infezione ed infiammazione sperimentalmente indotte

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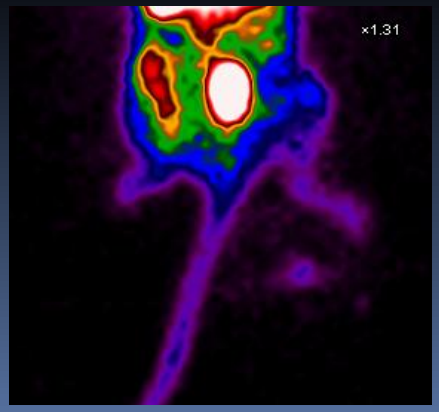
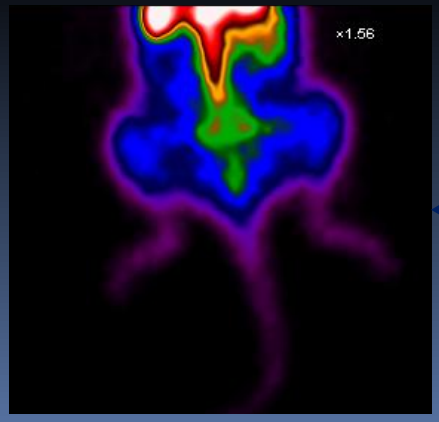
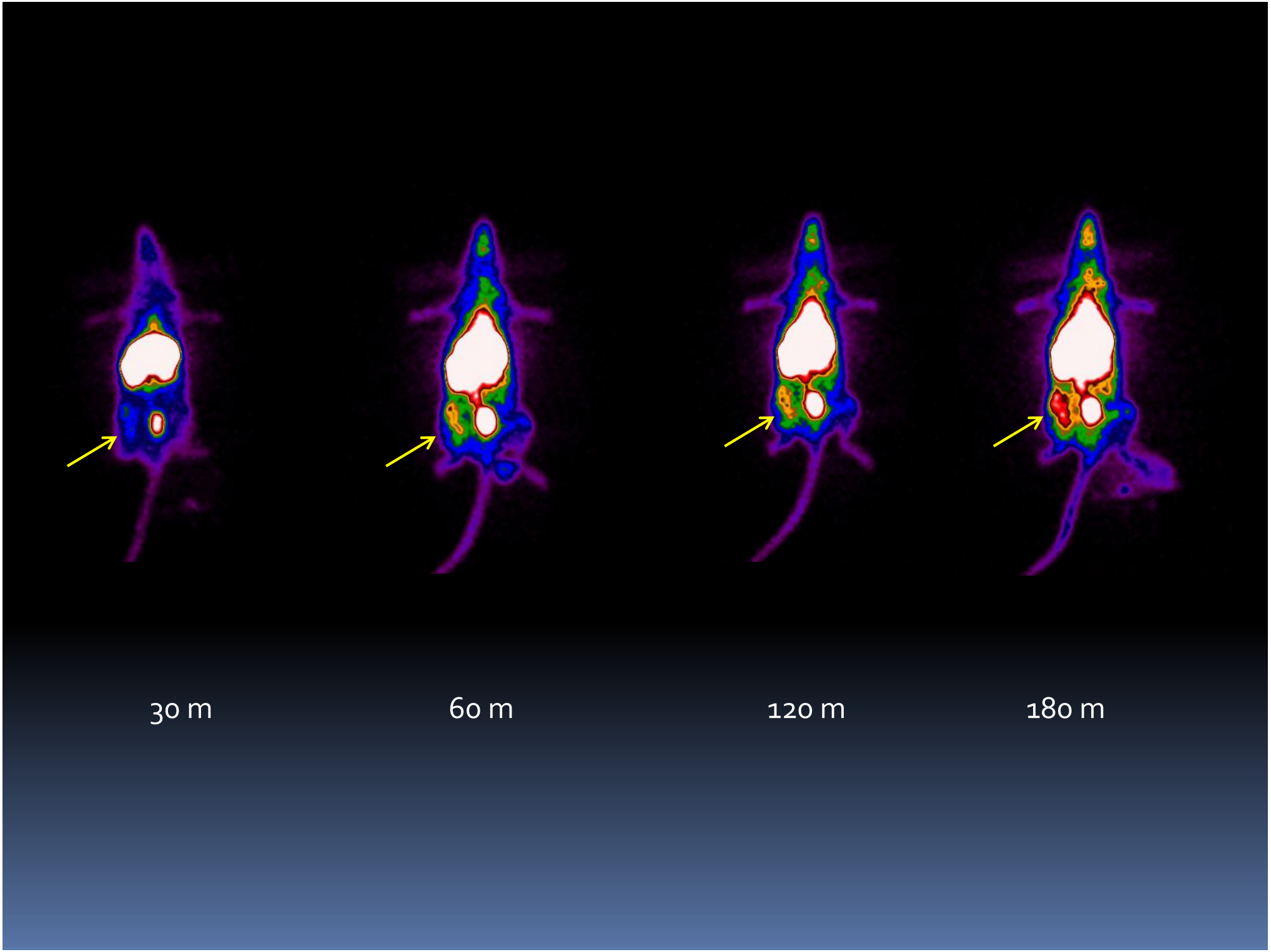




← **Controllo**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