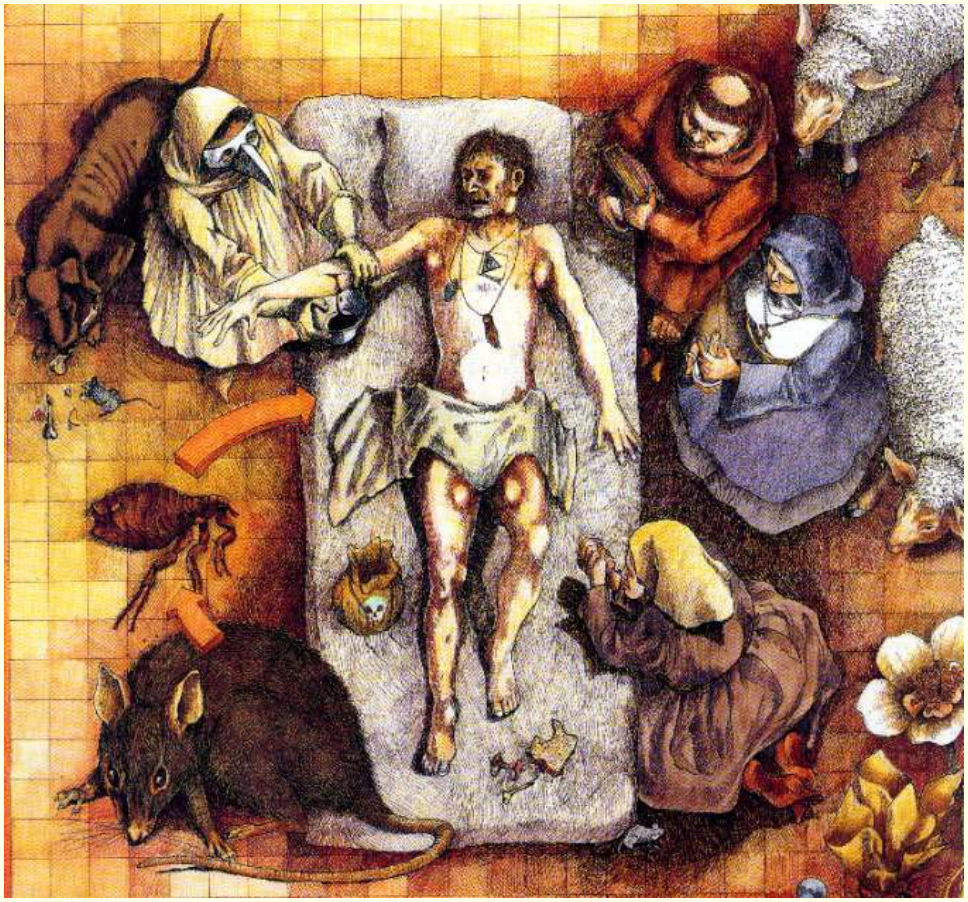
Yersinia pestis, its virulence plasmids and pigmentation locus



Olaf Schneewind, Great Lakes RCE for Biodefense & Emerging Infectious Diseases

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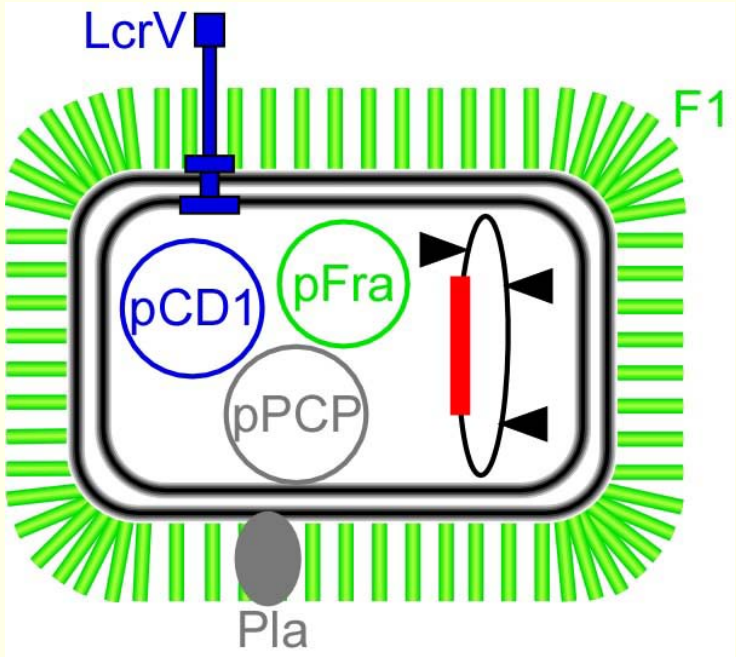
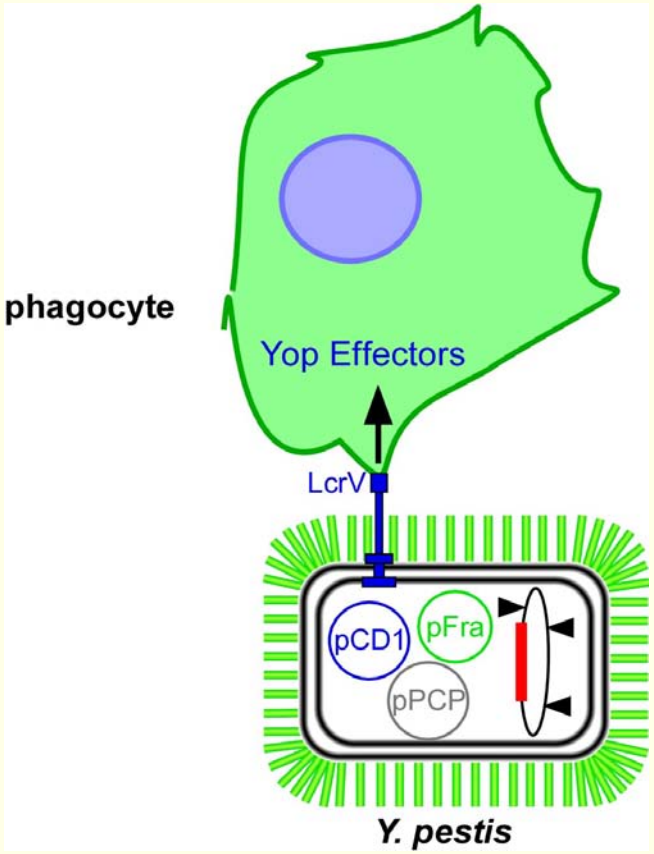
Yersinia pestis virulence plasmids, *pgm* locus and plague pathogenesis



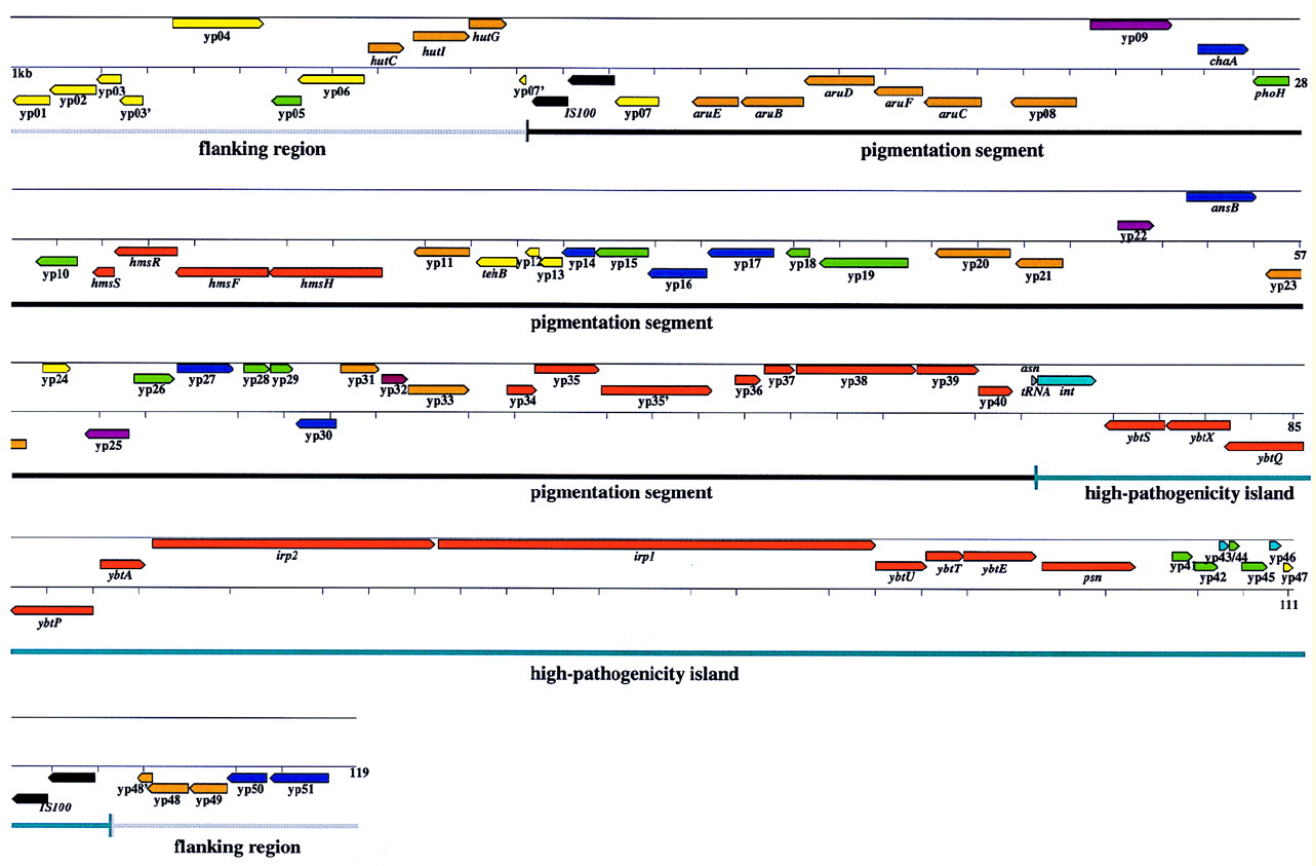


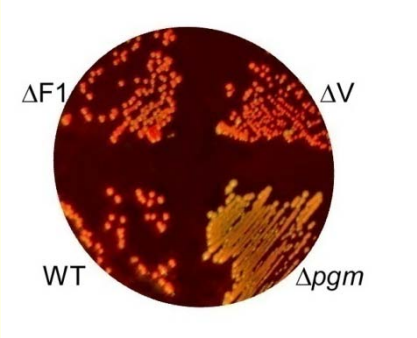
Plague vaccines

FDA approved plague vaccine is not available

- Killed whole cell vaccines
- Live attenuated vaccines
- Purified subunit vaccines
  - LcrV and its variants
  - Caf1 (F1) and F1-LcrV fusion

Yersinia pestis pgm locus and HPI





Buchrieser et al. IAI (1999)

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Virulence attributes of plague variants

Y. pestis	Mouse LD_{50} (CFU)			Rat			Guinea pig			NHP
	s.c.	i.n.	i.v.	s.c.	i.n.	i.v.	s.c.	i.n.	i.v.	aerosol
Wild-type	1-10	400	1-10	10^3	10^3	1-10	10	10^3	1-10	100
pCD1$^-$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$
pFra$^-$	1-10	400	1-10	$>10^7$	10^3	1-10	$>10^7$	10^3	1-10	100
ΔF1	1-10	400	1-10	10^7	10^3	1-10	10^7	10^3	1-10	100
pPCP1$^-$	10-$>10^6$	400	1-10	10-$>10^6$	10^3	1-10	10^3	10^3	1-10	100
Δ*pgm*	$>10^7$	10^5-10^7	1-10	$>10^7$	-	-	$>10^6$	-	-	$>10^7$

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Antibiotics and the therapy or prevention of plague

Drug	Exposure prophylaxis	Bubonic plague	Pneumonic plague
streptomycin (i.m.)	no	yes	yes
gentamycin (i.m.)	no	yes	yes
tetracycline (p.o.)	yes	2nd choice	2nd choice
ciprofloxacin (p.o. or i.v.)	yes	yes	yes
chloramphenicol	no	no	no

Acknowledgements

- Robert Perry – University of Kentucky

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