# In vivo expression kinetics of the PagN Salmonella entry factor

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**Introduction and aims:**
*Salmonella* are among the top-ranked foodborne pathogens, inducing a wide variety of diseases ranging from gastroenteritis to typhoid fever, depending on the infecting serovar, the host and its genetic background. As a facultative intracellular pathogen, it can induce its own internalization in non-phagocytic cells through at least 3 different bacterial factors: the SPI-1-encoded T3SS-1, and two outer membrane proteins, Rck and PagN. The *pagN* gene is part of the PhoP-PhoQ regulon, and was identified, though the use of *in vivo* expression technology, as a gene required for *Salmonella* Typhimurium survival in BALB/c mice [1]. It encodes for a widely conserved, 27 kDa protein displaying both structure and function homology with the proteins Hek and Tia of *E. coli.* This invasin allows *Salmonella* to invade cells through a Zipper-like mechanism, following interaction with heparan sulfate proteoglycans [2, 3]. However, its precise role *in vivo* remains to be determined including the cells targeted by this invasin. In this study, we aimed to precisely determine the kinetics of expression of this entry factor in mice.
**Material and methods:**
Bioluminescent *S.* Typhimurium reporter strains carrying transcriptional fusions were used to track the transcription of *pagN* in three murine models reproducing the different pathologies induced by *Salmonella*: typhoid fever, gastroenteritis and asymptomatic carriage.
**Results, discussion and conclusion:**
We observed a transcription of *pagN* in the intestine independently of the genetic background of the host and the inflammatory state of the animals. Moreover, *pagN* transcription was detected at later time points in lymphoid organs following the systemic spread of the pathogen in the typhoid fever reproducing model. This result demonstrates for the first time that *pagN* is expressed in the intestine and that its expression is different according to the pathology induced by *Salmonella.* Further analyses are in progress, focusing on the identification of the cells targeted by PagN.

Mots clés : Salmonella - PagN - Virulence - Expression - Bioluminescence.

Références :
1. Heithoff DM, Conner CP, Hanna PC, Julio SM, Hentschel U, Mahan MJ. 1997. Bacterial infection as assessed by in vivo gene expression. Proc Natl Acad Sci USA. 94:934-9.
2. Barilleau E, Vedrine M, Koczerka M, Burlaud-Gaillard J, Kempf F, Grepinet O, et al. 2021. Investigation of the invasion mechanism mediated by the outer membrane protein PagN of Salmonella Typhimurium. BMC Microbiol. 21:153.
3. Lambert MA, Smith SG. 2009. The PagN protein mediates invasion via interaction with proteoglycan. FEMS Microbiol Lett. 297:209-16.