

Publication

Analysis of *virC*, an operon involved in the secretion of Yop proteins by *Yersinia enterocolitica***JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 156260**Author(s)** Michiels, T; Vanooteghem, J C; Lambert de Rouvroit, C; China, B; Gustin, A; Boudry, P; Cornelis, G R**Author(s) at UniBasel** [Cornelis, Guy R.](#) ;**Year** 1991**Title** Analysis of *virC*, an operon involved in the secretion of Yop proteins by *Yersinia enterocolitica***Journal** Journal of bacteriology**Volume** 173**Number** 16**Pages / Article-Number** 4994-5009**Keywords** Amino Acid Sequence; Bacterial Outer Membrane Proteins/genetics/*metabolism; Bacteriophages/genetics; Base Sequence; Blotting; Northern; Western; Calcium/metabolism; Gene Expression Regulation; Bacterial; Genes/genetics; Genes; Bacterial/genetics; Klebsiella pneumoniae/genetics; Molecular Sequence Data; Open Reading Frames/genetics; Operon/*genetics; Plasmids; Sequence Homology; Nucleic Acid; Virulence; *Yersinia enterocolitica*/*genetics/metabolism/pathogenicity

Upon incubation at 37 degrees C in the absence of Ca²⁺ ions, pathogenic yersiniae release large amounts of pYV plasmid-encoded proteins called Yops that are involved in pathogenesis. *Yersinia enterocolitica* also expresses an outer membrane protein that is considered an adhesin and called YadA (previously called P1 or YopA). The production of Yops is coordinately regulated by a 20-kb region of the plasmid referred to as the Ca²⁺ dependence region and containing at least four loci called *virA*, *virB*, *virC*, and *virF*. The *virF* gene encodes a key transcriptional activator of *yop* genes. We have shown here that *virF* is also required for transcription of *yadA* and that *virB* is necessary for full transcription of the *yop* and *yadA* genes. In contrast, mutations in genes *virA* and *virC* had only a weak influence on the transcription of *yop* and *yadA* genes. These mutations did not affect the production of YadA but they completely inhibited the translocation of Yops from the intracellular compartment to the extracellular milieu. We inferred from these data that *virA* and *virC* are involved in the specific transport of Yops. We analyzed the 8.5-kb *virC* region and showed that it is most probably a single operon containing 13 open reading frames called *yscA* to *yscM* (for Yop secretion). Protein YscC has a putative signal sequence and shares significant homology with outer membrane proteins involved in the secretion of pullulanase by *Klebsiella pneumoniae* (PulD) or in the assembly of filamentous bacteriophages (gene IV product). At least the putative products of *yscD*, *yscJ*, and *yscL* were shown to be required for the export of Yops. YscJ turned out to be YlpB, a lipoprotein that we had detected previously. The *yscM* gene shares homology with *yopH*, the adjacent gene on the pYV plasmid. Its product does not appear to be necessary for the production of Yops. Transcription of the *virC* operon was subjected to the same regulation as the *yop* genes.

Publisher American Society for Microbiology**ISSN/ISBN** 1098-5530**edoc-URL** <http://edoc.unibas.ch/dok/A5259245>**Full Text on edoc** No;**PubMed ID** <http://www.ncbi.nlm.nih.gov/pubmed/1860816>**ISI-Number** WOS:A1991GB01400011

