Understanding of uptake and invasion routes of Yersinia ruckeri, causing Enteric Red Mouth Disease (ERM) in rainbow trout (Oncorhynchus mykiss), is essential for improved understanding of the pathogenicity and immune response mechanisms associated with this disease. The present work shed light on areas of invasion in rainbow trout by the use of immunohistochemistry and in situ hybridization techniques. Fish were exposed to live or formalin inactivated bacteria and samples were subsequently taken for histology from various outer and inner surfaces. We applied a specific monoclonal antibody and specific oligonucleotide probes binding to Y. ruckeri (serotype O1, biotype 2) in tissue sections and were able to demonstrate a tissue specific uptake of this bacterium (both formalin inactivated and live form). Uptake and subsequent translocation dynamics at various surfaces demonstrated different site specific propensities between the formalin inactivated and live bacterial organisms. Lateral lines, dorsal fin, epidermis and gastro-intestinal tract mucosal tissue were the primary areas where bacterial uptake was demonstrated readily after exposure. The fate of internalized bacterial organisms within the host suggested that central immune organs are involved in the final antigen processing.

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