

Erasmus University Rotterdam, the Netherlands
CSC PhD 2015 Project Description

School/Department:	Erasmus MC Rotterdam, Department of Surgery Research group: RE search P rojects for Ab dominal surgery I nnovation R otterdam (REPAIR) Prof. J.F. Lange, Prof. J. Jeekel, and Prof. G.J Kleinrensink
Project Title:	Prevention of anastomotic leakage after colorectal surgery
Abstract:	<p>Colorectal Anastomotic Leakage (CAL) remains a significant problem in the field of colorectal surgery, occurring in 8% to 20% of patients and causing a mortality rate as high as 33%. Despite extensive research in this field and recognition of many risk factors (e.g. ischemia , corticosteroid use and after hours surgery), still we are not able to prevent this major complication, and no significant reduction of the CAL rate is seen in the recent decades.</p> <p>Before we can successfully develop a strategy to prevent anastomotic leakage, we must gain profound insight into its etiology. Our research group has developed the first mouse CAL model and rat colectomy model. Derived from the colectomy model, we also developed other CAL models with different risk factors (e.g. anastomotic ischemia, steroid use, inflammatory bowel disease, and abdominal contamination). Leakage rate of 50%-70% is found in these models. Our previous research investigated the mechanisms of the anastomosis such as the changes of anastomotic configuration, morphology and strength, while our on-going studies further focus on the cells and molecules mediating the crucial steps in anastomotic healing process, and their malfunction in the leaking anastomosis. The PhD fellow will also join these studies using these models. Comprehensive knowledge regarding normal anastomotic healing and CAL mechanism is aimed in this research.</p> <p>The experimental data have been bringing us innovations regarding diagnosis and prevention of CAL. In addition to the mechanism research, the momentous task of the PhD fellow is to translate the experimental knowledge to clinical practice. Our research group has been investigating the early detection of CAL by analyzing the drainage components. From our previous studies, several promising new strategies have emerged such as quantification of bacteria and novel biomarkers (e.g. acute phase protein) in drainage or real-time evaluation of colorectal anastomosis by means of oxygen and carbon dioxide sensors. Our pilot clinical data encourage future application of those novel techniques, while evaluations in larger numbers of patients are still required, which will also be performed by the new PhD fellow.</p>

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	<p>Another important part of our CAL research is to apply tissue sealant to prevent CAL. After years of systematic investigation, several ideal tissue adhesives have been selected based on our previous ex-vivo, in-vitro and in-vivo rodent studies. The future experiments will focus on porcine tests and subsequently human application. The PhD fellow will also participate these projects to initiate the first human trials.</p>
Requirements of candidate:	<p>Background: a master-degree (or a bachelor-degree) in Medicine or Biology. Background in surgery is preferred. Master degree: Yes IELTS Grade: 7.0 (<i>minimal 6.0 per component</i>) or TOEFL: 100 (<i>minimal 20 per component</i>)</p>
Supervisor information:	<p>Professor Lange (professor in surgery), Professor Jeekel (professor in surgery), and Professor Kleinrensink (professor in anatomy and neuroscience) are principal investigators and directors of the REPAIR research group. They supervise the PhD-projects of 7 fulltime PhD-fellows and more than 20 part-time research fellows. Email: j.lange@erasmusmc.nl j.jeel@erasmusmc.nl g.kleinrensink@erasmusmc.nl</p> <p>Publication list:</p> <p>Daams, F., K. Monkhurst, J. van den Broek, J. C. Slieker, J. Jeekel and J. F. Lange. "Local Ischaemia Does Not Influence Anastomotic Healing: An Experimental Study." <i>Eur Surg Res</i> 50, no. 1 (2013): 24-31.</p> <p>Deerenberg, E. B., I. M. Mulder, M. Ditzel, J. C. Slieker, W. A. Bemelman, J. Jeekel and J. F. Lange. "Polyvinyl Alcohol Hydrogel Decreases Formation of Adhesions in a Rat Model of Peritonitis." <i>Surg Infect (Larchmt)</i>, (2012).</p> <p>Ditzel, M., E. B. Deerenberg, N. Komen, I. M. Mulder, H. Jeekel and J. F. Lange. "Postoperative Adhesion Prevention with a New Barrier: An Experimental Study." <i>Eur Surg Res</i> 48, no. 4 (2012): 187-93.</p> <p>Gadiot, R. P., M. S. Dunker, A. Mearadji and G. H. Mannaerts.</p>

	<p>"Reduction of Anastomotic Failure in Laparoscopic Colorectal Surgery Using Antitraction Sutures." <i>Surg Endosc</i> 25, no. 1 (2011): 68-71.</p> <p>Komen, N. A., M. J. Bertleff, L. J. van Doorn, J. F. Lange and P. W. de Graaf. "Helicobacter Genotyping and Detection in Peroperative Lavage Fluid in Patients with Perforated Peptic Ulcer." <i>J Gastrointest Surg</i> 12, no. 3 (2008): 555-60.</p> <p>Komen, N., R. W. de Bruin, G. J. Kleinrensink, J. Jeekel and J. F. Lange. "Anastomotic Leakage, the Search for a Reliable Biomarker. A Review of the Literature." <i>Colorectal Dis</i> 10, no. 2 (2008): 109-15; discussion 115-7.</p> <p>Komen, N., J. W. Dijk, Z. Lalmahomed, K. Klop, W. Hop, G. J. Kleinrensink, H. Jeekel, W. Ruud Schouten and J. F. Lange. "After-Hours Colorectal Surgery: A Risk Factor for Anastomotic Leakage." <i>Int J Colorectal Dis</i> 24, no. 7 (2009): 789-95.</p> <p>Komen, N., P. Klitsie, J. W. Dijk, J. Slieker, J. Hermans, K. Havenga, M. Oudkerk, J. Weyler, G. J. Kleinrensink and J. F. Lange. "Calcium Score: A New Risk Factor for Colorectal Anastomotic Leakage." <i>Am J Surg</i> 201, no. 6 (2011): 759-65.</p> <p>Komen, N., P. Klitsie, J. J. Hermans, W. J. Niessen, G. J. Kleinrensink, J. Jeekel and J. F. Lange. "Calcium Scoring in Unenhanced and Enhanced Ct Data of the Aorta-Iliacal Arteries: Impact of Image Acquisition, Reconstruction, and Analysis Parameter Settings." <i>Acta Radiol</i> 52, no. 9 (2011): 943-50.</p> <p>Komen, N., M. C. Morsink, S. Beiboer, A. Miggelbrink, P. Willemsen, E. van der Harst, J. F. Lange and W. B. van Leeuwen. "Detection of Colon Flora in Peritoneal Drain Fluid after Colorectal Surgery: Can Rt-Pcr Play a Role in Diagnosing Anastomotic Leakage?" <i>J Microbiol Methods</i> 79, no. 1 (2009): 67-70.</p> <p>Komen, N., J. Slieker, P. de Kort, J. H. de Wilt, E. van der Harst, P. P. Coene, M. P. Gosselink, G. Tetteroo, E. de Graaf, T. van Beek, R. den Toom, W. van Bockel, C. Verhoef and J. F. Lange. "High Tie Versus Low Tie in Rectal Surgery:</p>
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	<p>Comparison of Anastomotic Perfusion." <i>Int J Colorectal Dis</i> 26, no. 8 (2011): 1075-8.</p> <p>Komen, N., J. Slieker, P. Willemsen, G. Mannaerts, P. Pattyn, T. Karsten, H. de Wilt, E. van der Harst, Y. B. de Rijke, M. Murawska, J. Jeekel, J. F. Lange and Appeal Study Group. "Acute Phase Proteins in Drain Fluid: A New Screening Tool for Colorectal Anastomotic Leakage? The Appeal Study: Analysis of Parameters Predictive for Evident Anastomotic Leakage." <i>Am J Surg</i> 208, no. 3 (2014): 317-23.</p> <p>Komen, N., H. C. van der Wal, M. Ditzel, G. J. Kleinrensink, H. Jeekel and J. F. Lange. "Colorectal Anastomotic Leakage: A New Experimental Model." <i>J Surg Res</i> 155, no. 1 (2009): 7-12.</p> <p>Sandberg, Y., K. L. Wu, F. Heule, R. R. van den Bos, K. H. Lam, A. W. Langerak, V. H. van der Velden, K. van Lom and H. B. Beverloo. "Clinically and Genetically Atypical T-Cell Prolymphocytic Leukemia Underlines the Relevance of a Multidisciplinary Diagnostic Approach." <i>Haematologica</i> 92, no. 3 (2007): e34-6.</p> <p>Slieker, J. C., N. A. Komen, G. H. Mannaerts, T. M. Karsten, P. Willemsen, M. Murawska, J. Jeekel and J. F. Lange. "Long-Term and Perioperative Corticosteroids in Anastomotic Leakage: A Prospective Study of 259 Left-Sided Colorectal Anastomoses." <i>Arch Surg</i>, (2012).</p> <p>Slieker, J. C., K. A. Vakalopoulos, N. A. Komen, J. Jeekel and J. F. Lange. "Prevention of Leakage by Sealing Colon Anastomosis: Experimental Study in a Mouse Model." <i>J Surg Res</i> 184, no. 2 (2013): 819-24.</p> <p>Slieker, J. C., H. P. van't Sant, J. Vlot, F. Daams, F. W. Jansen and J. F. Lange. "Bowel Preparation Prior to Laparoscopic Colorectal Resection: What Is the Current Practice?" <i>J Laparoendosc Adv Surg Tech A</i> 21, no. 10 (2011): 899-903.</p> <p>Vakalopoulos, K. A., F. Daams, Z. Wu, L. Timmermans, J. J. Jeekel, G. J. Kleinrensink, A. van der Ham and J. F. Lange. "Tissue Adhesives in Gastrointestinal Anastomosis: A</p>
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	<p>Systematic Review." <i>J Surg Res</i> 180, no. 2 (2013): 290-300.</p> <p>Vakalopoulos, K. A., Z. Wu, L. Kroese, G. J. Kleinrensink, J. Jeekel, R. Vendamme, D. Dodou and J. F. Lange. "Mechanical Strength and Rheological Properties of Tissue Adhesives with Regard to Colorectal Anastomosis: An Ex Vivo Study." <i>Ann Surg</i>, (2014).</p> <p>van't Sant, H. P., W. F. Weidema, W. C. Hop, J. F. Lange and C. M. Contant. "Evaluation of Morbidity and Mortality after Anastomotic Leakage Following Elective Colorectal Surgery in Patients Treated with or without Mechanical Bowel Preparation." <i>Am J Surg</i> 202, no. 3 (2011): 321-4.</p> <p>Wu, Z., G. S. Boersema, K. A. Vakalopoulos, F. Daams, C. L. Sparreboom, G. J. Kleinrensink, J. Jeekel and J. F. Lange. "Critical Analysis of Cyanoacrylate in Intestinal and Colorectal Anastomosis." <i>J Biomed Mater Res B Appl Biomater</i> 102, no. 3 (2014): 635-42.</p> <p>Wu, Z., F. Daams, G. S. A. Boersema, J. Jeekel and J. F. Lange. "A Rat Model of Anastomotic Leakage Created by Insufficient Sutures after Partial Colectomy." In <i>British journal of surgery</i>, 100, 211-211: WILEY-BLACKWELL 111 RIVER ST, HOBOKEN 07030-5774, NJ USA, 2013.</p> <p>Wu, Z., F. Daams, G. S. A. Boersema, K. Vakalopoulos, K. Lam, P. van der Horst, Gert-Jan Kleinrensink, Johannes Jeekel and Johan Lange. "Colorectal Anastomotic Leakage Caused by Insufficient Suturing after Partial Colectomy: A New Experimental Model." <i>Surgical Infection</i>, (2014): Accepted article.</p> <p>Wu, Z., K. A. Vakalopoulos, G. S. A. Boersema, J. Jeekel and J. F. Lange. "Prevention of Anastomotic Leakage with Tissue Adhesives in Contaminated Environment." In <i>British journal of surgery</i>, 100, 5-5: WILEY-BLACKWELL 111 RIVER ST, HOBOKEN 07030-5774, NJ USA, 2013.</p> <p>Wu, Z., K. A. Vakalopoulos, L. F. Kroese, G. S. Boersema, G. J. Kleinrensink, J. Jeekel and J. F. Lange. "Reducing Anastomotic Leakage by Reinforcement of Colorectal Anastomosis with Cyanoacrylate Glue." <i>Eur Surg Res</i> 50, no.</p>
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