Curriculum Vitae | Gorm Mørk Hansen

UDDANNELSE

2017	Ph.D., Københavns Universitet.
2011	Cand.med., Københavns Universitet.

POSTGRADUATE ANSÆTTELSER

2017-	Reservelæge, Kardiologisk afd., Bispebjerg og Frederiksberg Universitets Hospital.
2013-2017	Klinisk assistent, Kardiologisk afd., Gentofte Universitetshospital.
2014-2016	Vikar: FV+BV, Kardiologisk Afd., Gentofte Universitetshospital.
2014-2015	Vikar: Akutlæge, Fælles Akutmodtagelsen, Slagelse Sygehus.
2014-2017	Cardioteam-instruktør (Avanceret simulationstræning), Gentofte Universitetshospital. >300 timers undervisning.
2013	Reservelæge (6 mdr.), Kardiologisk afd., Gentofte Universitetshospital.
2012-2013	Introduktionsstilling (12 mdr.), Kardiologisk afd., Gentofte Universitetshospital.
2012-2013	Klinisk tutor og underviser, Københavns Universitet.
2011-2012	Klinisk basisuddannelse (6 mdr.), Reumatologisk afdeling, Aalborg Universitetshospital.
2011	Klinisk basisuddannelse (6 mdr.), Kirurgisk afdeling, Aalborg Universitetshospital.

AKADEMIKER

2017-	Påbegyndt post.doc.-projekt med forankring på Københavns Universitet og Kardiovaskulært Forskningscenter, Aalborg Universitetshospital.
2017	Ph.D.: *The Infection Hypothesis of Atherothrombosis: Focus on Periodontal Bacteria*. Vejleder: Ovl. Dr.med., Peter Riis Hansen, Gentofte Universitetshospital.
2016	Poster-præsentation Forskningens dag, Herlev-Gentofte Hospital.
2015	Foredrag: Orale bakterier og IHS, Tandlæge Symposium, Ikast.
2011	Junior-forsker. Kardiovaskulært Forskningscenter, Aalborg Universitetshospital.
2007-2010	Prægraduate forskning: OSVAL II: *Postoperative Mediastinitis in Cardiac Surgery*. Vejleder Ovl. Henrik Arendrup, Thoraxkirurgisk Afd. Rigshospitalet, Københavns Universitet. OSVAL I: *Umbilical cord stemcell research: General advances and utilization*. Vejleder Ovl. Hanne Cathrine Bisgaard, Institut for Cellulær og Molekylær Medicin, Panum Inst, Københavns Universitet.

PUBLIKATIONSLISTE

Hansen GM, Belstrøm D, Nilsson M, Helqvist S, Nielsen CH, Holmstrup P, Tolker-Nielsen T, Givskov M, Hansen PR. *Pseudomonas aeruginosa* microcolonies in coronary thrombi from patients with ST-segment elevation myocardial infarction. (accepted manuscript PLoS ONE 2016)

Hansen GM, Egeberg A, Holmstrup P, Hansen PR. Relation of periodontitis to risk of cardiovascular and all-cause mortality (from a Danish nationwide cohort study). Am J Cardiol 2016;118:489-93.

Hansen GM, Nilsson M, Nielsen CH, Holmstrup P, Helqvist S, Tolker-Nielsen T, Givskov M, Hansen PR. Absence of bacteria on coronary angioplasty balloons from unselected patients: results with use of a high sensitivity polymerase chain reaction assay. PLoS ONE 2015;10(12):e0145657. Microbiome. 2015 Sep 3;3:38. doi: 10.1186/s40168-015-0100-y.

Mitra S**,** Drautz-Moses DI, Alhede M, Maw MT, Liu Y, Purbojati RW, Yap ZH, Kushwaha KK[1], Gheorghe AG, Bjarnsholt T, **Hansen GM**, Sillesen HH, Hougen HP, Hansen PR, Yang L, Tolker-Nielsen T, Schuster SC**,** Givskov M. In silico analyses of metagenomes from human atherosclerotic plaque samples. Microbiome. 2015 Sep 3;3:38. doi: 10.1186/s40168-015-0100-y.

Hansen GM, Holmstrup P, Nielsen TT, Køllgaard T, Nielsen CH, Givskov M, Hansen PR. Mulig sammenhæng mellem marginal parodontitis og iskæmisk hjertesygdom. Ugeskr Læger 2014;176:V01140065

Hansen GM, Jensen CS, Ostergaard LM, Dethlefsen C, Luther P, Andreasen JJ. Muligt fald i prævalensen af nosokomielle infektioner efter akkrediteringsprocessen i Region Nordjylland. Ugeskr Læger 2013;175;495-8.

Pseudomonas aeruginosa Microcolonies in Coronary Thrombi from Patients with ST Segment Elevation Myocardial Infarction

Gorm Mørk Hansen, Daniel Belstrøm, Martin Nilsson, Steffen Helqvist, Claus Henrik Nielsen, Palle Holmstrup, Tim Tolker-Nielsen, Michael Givskov, Peter Riis Hansen.

Abstract: Chronic infection is associated with an increased risk of atherothrombotic disease and direct bacterial infection of arteries has been suggested to contribute to the development of unstable atherosclerotic plaques. In this study, we examined coronary thrombi obtained *in vivo* from patients with ST-segment elevation myocardial infarction (STEMI) for the presence of bacterial DNA and bacteria. Aspirated coronary thrombi from 22 patients with STEMI were collected during primary percutaneous coronary intervention and arterial blood control samples were drawn from radial or femoral artery sheaths. Analyses were performed using 16S polymerase chain reaction and with next-generation sequencing to determine bacterial taxonomic classification. In selected thrombi with the highest relative abundance of *Pseudomonas aeruginosa* DNA, peptide nucleic acid fluorescence *in situ* hybridization (PNA-FISH) with universal and species specific probes was performed to visualize bacteria within thrombi. From the taxonomic analysis we identified a total of 55 different bacterial species. DNA from *Pseudomonas aeruginosa* represented the only species that was significantly associated with either thrombi or blood and was >30 times more abundant in thrombi than in arterial blood ($p<0.0001$). Whole and intact bacteria present as biofilm microcolonies were detected in selected thrombi using universal and *P. aeruginosa*-specific PNA-FISH probes. *P. aeruginosa* and vascular biofilm infection in culprit lesions may play a role in STEMI, but causal relationships remain to be determined.

Relation of Periodontitis to Risk of Cardiovascular and All-Cause Mortality (from a Danish Nationwide Cohort Study)

Gorm Mørk Hansen, Alexander Egeberg, Palle Holmstrup, and Peter Riis Hansen.

Abstract: Periodontitis and atherosclerosis are highly prevalent chronic inflammatory diseases, and it has been suggested that periodontitis is an independent risk factor of cardiovascular disease (CVD) and that a causal link may exist between the 2 diseases. Using Danish national registers, we identified a nationwide cohort of 17,691 patients who received a hospital diagnosis of periodontitis within a 15-year period and matched them with 83,003 controls from the general population. We performed Poisson regression analysis to determine crude and adjusted incidence rate ratios of myocardial infarction, ischemic stroke, cardiovascular death, major adverse cardiovascular events, and all-cause mortality. The results showed that patients with periodontitis were at higher risk of all examined end points. The findings remained significant after adjustment for increased baseline co-morbidity in periodontitis patients compared with controls, for example, with adjusted incidence rate ratio 2.02 (95% CI 1.87 to 2.18) for cardiovascular death and 2.70 (95% CI 2.60 to 2.81) for all-cause mortality. Patients with a hospital diagnosis of periodontitis have a high burden of co-morbidity and an increased risk of CVD and all-cause mortality. In conclusion, our results support that periodontitis may be an independent risk factor for CVD.

Absence of Bacteria on Coronary Angioplasty Balloons from Unselected Patients: Results with Use of a High Sensitivity Polymerase Chain Reaction Assay

Gorm Mørk Hansen, Martin Nilsson, Claus Henrik Nielsen, Palle Holmstrup, Steffen Helqvist, Tim Tolker-Nielsen, Michael Givskov, Peter Riis Hansen.

Abstract: Periodontitis is a chronic, bacterially-induced inflammatory disease of the tooth-supporting tissues, which may result in transient bacteremia and a systemic inflammatory response. Periodontitis is associated with coronary artery disease independently of established cardiovascular risk factors, and translocation of bacteria from the oral cavity to the coronary arteries may play a role in the development of coronary artery disease. Very few studies have used angioplasty balloons for *in vivo* sampling from diseased coronary arteries, and with varying results. Therefore, the aim of this study was to assess if bacterial DNA from primarily oral bacteria could be detected on coronary angioplasty balloons by use of an optimized sampling process combined with an internally validated sensitive polymerase chain reaction (PCR) assay. Coronary angioplasty balloons and control samples from a total of 45 unselected patients with stable angina, unstable angina/non-ST elevation myocardial infarction, and ST-elevation myocardial infarction (n = 15 in each group) were collected and analyzed using a PCR assay with high sensitivity and specificity for 16S rRNA genes of the oral microbiome. Despite elimination of extraction and purification steps, and demonstration of sensitivity levels of 25–125 colony forming units (CFU), we did not detect bacterial DNA from any of the coronary angioplasty balloons. A subsequent questionnaire indicated that the prevalence of periodontitis in the study cohort was at least 39.5%. Although coronary angioplasty balloons are unlikely to be useful for detection of bacteria with current PCR techniques in unselected patients with coronary artery disease, more studies are warranted to determine the extent to which bacteria contribute to atherosclerosis and its clinical manifestations and whether the presence of bacteria in the arteries is a transient phenomenon.