

# Annual Report 2020

SATC center

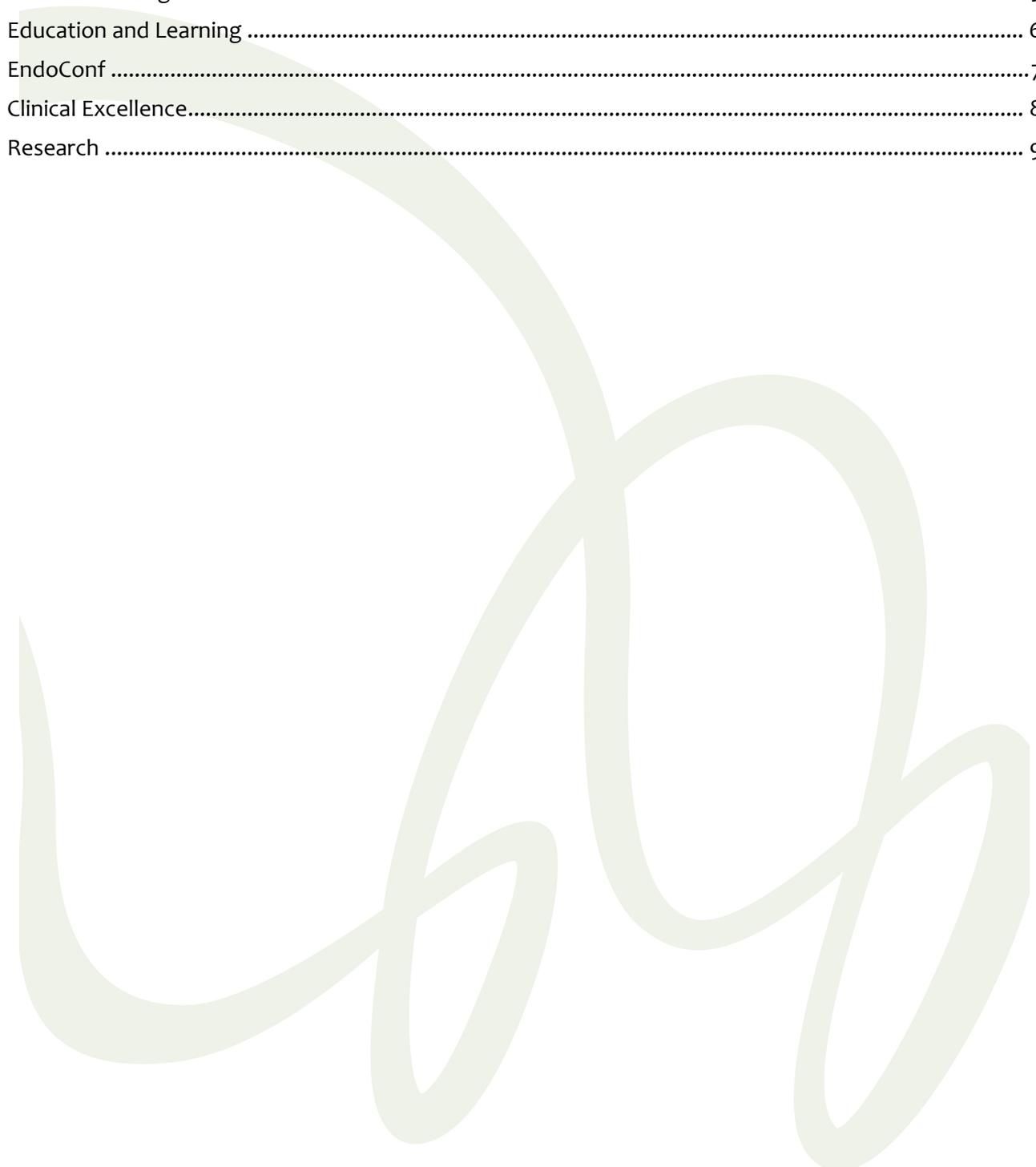
Department of Surgery

Odense University Hospital

Svendborg Hospital

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# Preface

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The SATC Center (SATCC) is embedded in the unit for Neoplastic Colorectal Research, Department of Surgery, Odense University hospital, Svendborg Hospital. It is now running on its 7<sup>th</sup> year and has achieved national as well as international recognition in all three tracks of activity. The year 2020 has, in all aspects, been atypical and almost all our courses and symposia's were cancelled due to the Covid-19 situation.

Learning and  
Education

Clinical  
Excellence

Research and  
Development

## Teaching and Education:

Our resources were reallocated from March 2020 to prepare the regional colonoscopy courses suggested by the RSD Steering Group for Cancer Screening as part of the national health authority's efforts to improve colonoscopy quality in screening.

In collaboration with the regional specialist counsel, 3 courses were defined. One for young doctors new to colonoscopy practice (about 50 procedures), one for experienced specialists and one train-the-trainee course. These courses have now been planned into details and are ready to be launched as soon as the Covid-19 situation allows.

Further engagement in a Scandinavian cooperatative activity together with Malmø and Goteborg awaits decreasing Covid 19 risks . Especially fields of ESD (endoscopic submucosal dissection) and co-working on symposias / courses has been issues of interest. Visiting each others departments is expected to be carried out as soon as this kind of activity becomes safe.

## Research:

Our research Unit has been appointed as a Center of Excellence by the RSD further increasing the research activity of the SATCC. We expect to appoint one professor more in 2021 to ensure the further growth and development. A second post.doc. has been employed also during 2020 and we are employing 2 new Ph.D. students in 2021. The Covid-19 situation has prevented more clinical studies to be initiated but the activity has been reallocated into registry-based studies, meta-analysis and systematic reviews thereby matching last year's record of 26 published papers. The impact of the journals used has increased significantly.

## Development:

The development of technological aids to teaching and training has been ongoing for 3 years and the “EndoConf” system allowing for real time consultations between hospitals during the endoscopy has now been tested internally between the Hospitals in Nyborg, Odense and Svendborg. As described later, there has been quite a few challenges in transmitting high quality pictures and in minimizing, the time from contact to conference is ongoing. Most challenges have been met – only safe and secure communication across the hospital firewall to private practicing endoscopists has proven to be insolvable. The EndoConf system is now about to be used in hospitals outside OUH – in Esbjerg.

#### Clinical Excellence:

Database hosting is a natural element of continuous quality improvement of clinical activity and significant efforts were invested in the updating of the EMR - ESD and TEM Database. The aim is to include new parameters necessary for further advancement and updating of the quality of our clinical activity. A quality assessment of the EndoConf system has indicated that running this for one year in clinical routine has already added to the competences of the corps of endoscopist. The daily EndoConf consultations for discussion of treatment allocation has diminished by more than 50% since the introduction of EndoConf. The platform therefore does not only increase the level of knowledge and practical skills, but also saves time and need for repeat procedures.

All courses has been revised and updated and emphasis has been on the skills of endoscopist at all levels.

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## SATC Center Organisation

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SATCC is located in the House of Research (Forskningens Hus), Department of Surgery, OUH Svendborg Hospital, Baagøes Allé 15, entrance 41, 5700 Svendborg, Denmark.

## **Department of Surgery Management**

Executive Consultant Claus Christian Vinther

Head Nurse Susanne Barren

## **SATCC Secretariat**

Consultant Niels Buch, Head of Centre in area of clinical development / courses

Professor Gunnar Baatrup, Director of Research

Education Secretary and Responsible for Communication Lene von Fintel Sostack

Staff Doctor Anders Høgh

Staff Doctor Issam Al-Najami

Staff Doctor Thomas Bjørsum-Meyer

Project Nurse Anja Wulle

Project Nurse Christina Petersen

Student Assistant Mie Kruse Wollesen

Student Assistant Anne-Line Volden Havshøi

Student Assistant Mikkel Vildmand

External Advisor Søren Meisner

## **Regional Working Group**

A regional working group, consisting of specialist doctors from each of the specialist units in the region's other hospitals, has been formed. The working group's task is to pave the way for regional prioritisation and coordination of the centre's activities, including the preparation of education programmes/concepts.

Executive Consultant Claus Christian Vinther heads the working group, which is assisted by the secretariat.

## **Advisory Board**

Additionally, the centre has an Advisory Board, which provides advice and sparring on visions, strategies, and professional matters within the core area. Members of the Advisory Board:

Claus Duedal Pedersen, Chief Consultant, Dept. of Clinical Development, OUH University Hospital, Svendborg Hospital.

Birger Endreseth, Trondheim, Surgical Clinic, St. Olav's Hospital, Norway.

Deidre Mc Namara, Associate Professor, Head of dept. Clinical Medicine, Tallaght Hospital, Trinity College Dublin.

Professor Regina Beets-Tan, Dept. of Radiology, The Netherlands Cancer Institute, Amsterdam.

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## Activity 1: SATCC Education and Learning

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2020 was a very different year. COVID19 has had a huge effect on our normal educational output.

The lack of personal direct communication cannot be fully compensated by digital meetings and mails. The exchange of ideas and inspiration talking to foreign colleagues outside the presentation hall on congresses is evidently missing. As well as the complete stop for courses since March, the aspect of education is reduced to a minimum. Digital meetings, courses and congresses is now appearing from everywhere and the SATCC is considering and working on this modality.

We usually have 4-5 courses as well as a symposium, but unfortunately this year the pandemic and restrictions came to cancellation of all except 1 course was able to run before corona lockdown - "Endoscopic Resection of Colorectal Neoplasia-Module 1: The Fundamentals" where endoscopists from home and abroad shared a day full of theory, but also hands on workshops.

We have looked into online alternatives, but our courses are primarily build on hands on teaching which is difficult online. We hope that 2021 will be the year where we again can host all of our activities.

We have already planned a symposium on AI. The symposium is an International, Multidisciplinary Meeting and Work Shop on medical and technological aspects of camera capsule technology.

The aim is to gather gastroenterologists, surgeons and other with interest in advanced GI diagnostics and early intervention and they will meet engineers dedicated to camera capsule technology – hardware and software. Future clinical demands and technical inventions and developments will be discussed. Focus will be on robotic hardware and especially artificial intelligence in picture analysis as well as clinical aspects of colorectal cancer diagnostics, inflammatory bowel disease and other intestinal condition.

### Fellowships

A new field of education is offered doctors from and outside the region in terms of fellowships for a short period of time. The key interest placed in performing TRUS (trans rectal ultrasonography) and endoscopic macroscopic examination of polyps and early cancers using different advanced types of light, colouring and other diagnostic tools. How to choose the best possible treatment from the existing, large variety of methods, by far most of them used in our department. This possibility was offered till late November, but stopped due to increased Covid19 risk. New fellows are scheduled, and signed up to March depending on level of the pandemic.

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## Activity 2: EndoConf

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EndoConf is a real-time audio-video-link system between the primary endoscopist in the endoscopy room and an expert endoscopist on duty. The expert will receive the EndoConf call on a mobile tablet, enabling the expert to be 'on call', during a normal workday.

The system was invented by the SATCC and developed in collaboration with the medico-technique department at OUH

The audio-video-link carries an audio signal, a video signal from the endoscopy room, and a video signal from the endoscope. Thus, the system enables a live mini-conference between the endoscopist from any of the endoscopy units in the Region of Southern Denmark and an expert endoscopist at Surgical Department A, Odense University Hospital.

On Funen the system is used daily between two of three hospitals. As well the patients, the endoscopist and the medical staff express satisfaction, and concretely after a mini-conference there's a higher confidence in strategy planning of the treatment of pathological findings.

We want to present the opportunity that the system, can assist education of the endoscopist in diagnostic colonoscopy and simple polypectomy.

The deployment of the system to the endoscopy units across the Region of Southern Denmark is planned primo January 2021, where the system will be introduced to Surgical department, Sydvestjysk Sygehus. The introduction is postponed due to the Covid19 pandemic.

We have experience with usage of the system on daily basis since September 2019. In the same period the usage of the Electronic Patient Journal system of photo- and video documenting the endoscopic procedures were addressed in our department.

Hence, there was a great focus on the correct visitation of large colorectal polyps. And the documentation of the procedure, either by using the EndoConf system, or by using the photo and video documenting system. (Endobase, Olympus)

In the first 10 weeks we recorded data of all the procedures, where EndoConf were used. We are in progress of presenting these data as well as presenting the introduction of a new supervision tool in the endoscopy room.

The data where; endoscopy room number, the doctor and the result of the conference

This merely to have a knowledge to identify any systematically IT-difficulties needed a solution, before implementation of the system throughout the Region of Southern Denmark.

Due to the Covid19 pandemic, we could not address the IT-challenges of communicating with vulnerable data through the firewall of the Region of Southern Denmark's Network. Preventing us from finding a solution to connect the private endoscopists and our regional expert center.

We are ready to implement the system in other departments, to have inputs from other users, and learn what great opportunities is incooperated in this EndoConf system.

We believe it is a turning point within educating the endoscopists with specific procedures.

An excellent way to have supervision to endoscopic nurses.

A quick and precise solution to the difficult situation, where the endoscopist needs expert advice.

Endoscopy beginners attend theoretical courses, work under supervision until they reach a certain level of competence in diagnostic colonoscopy. The further development from there is, due to lack of human resources, often left to trial-and-error methods and this system might ease the transition from supervised to independent practice.

Thus the EndoConf system provides solutions that will secure the patients from undergoing unnecessary endoscopic procedures. At the same time secure the avoidance of any hazardous attempt of polypectomy, when it should be referred to expert tertiary center.

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## Activity 4: SATCC Clinical Excellence

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eFTR: Endoscopic Full Thickness Resection is a method for endoscopically treatment of recurrence or residual tissue after polypectomia, after non radical excision of T1 (T2) polypcancers and for small polyps when macroscopically or ultrasonographic evaluation are uncertain but obviously not more than T1 lesions. Former the endoscopic treatment of these conditions was only possibly In the rectum by TEM. A large clip is placed around and beneath the specimen and kept closed for healing after resection (sling) of the specimen. Our team has performed a high number of eFTR s and in 2020 joined a paper about this method together with University Hosp Sjælland (Køge) and additionally now sent in a paper for publication of our own results. The method has been introduced to Esbjerg Surgical dept by a demonstration visit on request.

ESD : Endoscopic Submucosal Dissection has been used for a limited period of time in scandinavia and Europe. High pressure Injection of lifting fluid under a polyp followed by current dissection with an endoscopic needle ensures a complete resection of a large polyp (ie 25-80 mm) In one piece. Now in 2020 used on weekly basis 1-3 times in our team. Furthermore, we have improved the method using different aiding tools for better visualization and thereby faster and more safe resection. Handing in a video/paper for publication about this, is in progress.

### Testing Equipment

Olympus /GI Gineous Medtronics : AI, Artificial Intelligence combined with endoscopic examination have been tested for three weeks in our department. The equipment adds a highlight function pointing out areas of interest/ possible polypoid tissue/ cancer In the colonic lumen. Some beneficial features was

noticed, especially for less experienced colonoscopists, but also obvious deficits ie extremely noisy performance. A new and improved model will be tested in 2021

Various types of Endoscopic slings, biopsy forceps, ESD equipment and new Olympus Endoscope have been tested.

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## Activity 5: SATCC Research

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The appointment as a center of excellence in “Clinical Implementation in Camera Capsule Technology” was effected in January 2020. It was the third appointment in 7 years and came on top of “The national Reference Center for Early Colorectal Neoplasia” in 2015 granted by the Danish Cancer Society and the “SATCC” donated by the Region of Health care of Southern Denmark in 2017. The research focus has gradually shifted more and more into prevention, endoscopic intervention and diagnostics. We feel that this is where it still is possible to improve statistics on colorectal cancer outcome. Internationally non-surgical treatment is becoming an integral part of CRC treatment in an increasing number of patients and in more and more advanced disease. Even though this might be bad news in the surgical department, the patient’s perspectives drive the research.

The Covid19 situation has had a great impact on the clinical trial activity. The major CCE2015 trial of camera capsule technology in screening was delayed by 6 months, but finally started patient inclusion in August 2020 and is now running for the next 18 months occupying a large proportion of the work capacity in the unit. An interim analysis was conducted in December and showed that the trial is doing well.

The international STAR-TReC trial was doing well in the trial phase 2 and inclusion of patients were exceeding all expectations in all contributing countries. Two important publications were published on the study, and the next is being negotiated with the New Eng. J. Med. The patient inclusion was, however stopped in our unit by the management and the section head of the colorectal section. Issam Al-Najami is still member of the protocol group and report fine progress in the phase 3. New countries such as Belgium and Sweden is joining the study in 2021.

The research in chemo-prevention against colorectal cancer had a set-back because we did not get the funding necessary in 2020. Minor trials and experiments are still being performed, but the decisive clinical trial is still pending, waiting for sufficient funding.

The collaboration with the engineers at the Maersk McKinney Møller institute at SDU led to more publications and several interesting Artificial Intelligence algorithms that is now in the process of validation. The hardware development is also progressing, and a new camera capsule with on-board intelligence was successfully tested in a pig. The unit has launched a very ambitious database on camera capsule investigations employing 4 medical students just to feed the database with clinical data and pictures.

A major collaboration with Sundhed.dk on creating a safe and approved sky-based hosting of camera capsule videos and for the analytical processes succeeded in early summer. After investing more than 2 mio. dkk., the sky function is now up running. It is now being used for data transference between patients, patient files and doctors. Data now flow freely between the OPEN database we created last year, patient receivers, EPJ and doctors. The report is available to the patients in Sundhed.dk also.

The long lasting collaboration with our Scottish friends in Camera Capsule Technology has been strengthened and led to more protocols and to joint use of CCE videos for artificial intelligence algorithm production and validation.

Protocols for more important and ambitious studies, both local, national and international have been prepared on colorectal cancer prevention, camera capsule technology, Dual Energy CT staging of rectal cancer and more. The international network is growing and more publications than ever has been produced in international collaborations. Both postdocs and ph.d's have been aboard for up to 12 months for research collaborations and they came back with high ambitions and new ideas.

#### **Publications from SATCC in 2020:**

The thoroughly revised second edition of the book: "Multidisciplinary Treatment of Colorectal Cancer" was published with Editor Gunnar Baatrup by the Springer Verlag. It contains multiple chapters from our unit, associate professors and collaboration partners.

More articles in Danish was published in "Medicotechnik", "Videnskab", "Ugeskrift for Læger" and news papers.

Original Pub-Med registered papers:

[Local excision after polypectomy for rectal polyp cancer: when is it worthwhile?](#)

Jones HJS, Al-Najami I, **Baatrup G**, Cunningham C. Colorectal Dis. 2020 Dec 11. doi: 10.1111/codi.15480. Online ahead of print. PMID: 33306264

[Colon Capsule Endoscopy vs. CT Colonography Following Incomplete Colonoscopy: A Systematic Review with Meta-Analysis.](#)

Deding U, Kaalby L, Bøggild H, Plantener E, Wollesen MK, Kobaek-Larsen M, Hansen SJ, **Baatrup G**. Cancers (Basel). 2020 Nov 13;12(11):3367. doi: 10.3390/cancers12113367. PMID: 33202936 **Free PMC article**. Review.

[Dyssynergic patterns of defecation in constipated adolescents and young adults with anorectal malformations.](#)

Bjørsum-Meyer T, Christensen P, **Baatrup G**, Jakobsen MS, Asmussen J, Qvist N. Sci Rep. 2020 Nov 12;10(1):19673. doi: 10.1038/s41598-020-76841-5. PMID: 33184420 **Free PMC article**.

[Magnetic resonance imaging of the anal sphincter and spine in patients with anorectal malformations after posterior sagittal anorectoplasty: a late follow-up cross-sectional study.](#)

Bjørsum-Meyer T, Christensen P, **Baatrup G**, Jakobsen MS, Asmussen J, Qvist N. *Pediatr Surg Int.* 2021 Jan;37(1):85-91. doi: 10.1007/s00383-020-04774-1. Epub 2020 Nov 3. PMID: 33141917

[Diagnostic accuracy of capsule endoscopy compared with colonoscopy for polyp detection: systematic review and meta-analyses.](#)

Kjølhede T, Ølholm AM, Kaalby L, Kidholm K, Qvist N, **Baatrup G**. *Endoscopy.* 2020 Aug 28. doi: 10.1055/a-1249-3938. Online ahead of print. PMID: 32858753

[Colon capsule endoscopy versus CT colonography after incomplete colonoscopy. Application of artificial intelligence algorithms to identify complete colonic investigations.](#)

Deding U, Herp J, Havshoei AL, Kobaek-Larsen M, Buijs MM, Nadimi ES, **Baatrup G**. *United European Gastroenterol J.* 2020 Aug;8(7):782-789. doi: 10.1177/2050640620937593. PMID: 32731841 **Free PMC article.**

[Effects of Screening Compliance on Long-Term Reductions in All-Cause and Colorectal Cancer Mortality.](#)

Shaukat A, Kaalby L, **Baatrup G**, Kronborg O, Duval S, Shyne M, Mandel JS, Church TR. *Clin Gastroenterol Hepatol.* 2020 Jul 4:S1542-3565(20)30825-9. doi: 10.1016/j.cgh.2020.06.019. Online ahead of print. PMID: 32634624

[Colon capsule endoscopy in colorectal cancer screening: a randomised controlled trial.](#)

Kaalby L, Deding U, Kobaek-Larsen M, Havshoi AV, Zimmermann-Nielsen E, Thygesen MK, Kroeijer R, Bjørsum-Meyer T, **Baatrup G**. *BMJ Open Gastroenterol.* 2020 Jun;7(1):e000411. doi: 10.1136/bmjgast-2020-000411. PMID: 32601101 **Free PMC article.**

[Correlation of anorectal manometry measures to severity of fecal incontinence in patients with anorectal malformations - a cross-sectional study.](#)

Bjørsum-Meyer T, Christensen P, Jakobsen MS, **Baatrup G**, Qvist N. *Sci Rep.* 2020 Apr 7;10(1):6016. doi: 10.1038/s41598-020-62908-w. PMID: 32265467 **Free PMC article.**

[Mesorectal radiotherapy for early stage rectal cancer: A novel target volume.](#)

Peters FP, Teo MTW, Appelt AL, Bach S, **Baatrup G**, de Wilt JHW, Jensenius Kronborg C, Garm Spindler KL, Marijnen CAM, Sebag-Montefiore D. *Clin Transl Radiat Oncol.* 2020 Feb 4;21:104-111. doi: 10.1016/j.ctro.2020.02.001. eCollection 2020 Mar. PMID: 32099912 **Free PMC article.**

[Carrot Intake and Risk of Colorectal Cancer: A Prospective Cohort Study of 57,053 Danes.](#)

Deding U, **Baatrup G**, Christensen LP, Kobaek-Larsen M. *Nutrients.* 2020 Jan 27;12(2):332. doi: 10.3390/nu12020332. PMID: 32012660 **Free PMC article.**

[Quality of life after rectal-preserving treatment of rectal cancer.](#)

Jones HJS, Al-Najami I, Cunningham C. Eur J Surg Oncol. 2020 Nov;46(11):2050-2056. doi: 10.1016/j.ejso.2020.07.018. Epub 2020 Jul 22. PMID: 3277313

[Falcarindiol Purified From Carrots Leads to Elevated Levels of Lipid Droplets and Upregulation of Peroxisome Proliferator-Activated Receptor- \$\gamma\$  Gene Expression in Cellular Models.](#)

Andersen CB, Runge Walther A, Pipó-Ollé E, Notabi MK, Juul S, Eriksen MH, Lovatt AL, Cowie R, Linnet J, **Kobaek-Larsen M**, El-Houri R, Andersen MØ, Hedegaard MAB, Christensen LP, Arnspang EC. Front Pharmacol. 2020 Aug 28;11:565524. doi: 10.3389/fphar.2020.565524. eCollection 2020. PMID: 32982759 **Free PMC article.**

[Impact of Spinal Defects on Urinary and Sexual Outcome in Adults With Anorectal Malformations-A Cross-sectional Study.](#)

**Bjørsum-Meyer T**, Lund L, Christensen P, Jakobsen MS, Asmussen J, Qvist N. Urology. 2020 May;139:207-213. doi: 10.1016/j.urology.2020.01.026. Epub 2020 Feb 4. PMID: 32032684