BRACCO FELLOWSHIPS
EDUCATION IN RESEARCH
ENROLMENT FORM

Name of Institution: Umeå University, Department of Radiation Sciences

City and Country of Institution: Umeå Sweden

RESEARCH GROUP

Brief description of the research group and of its mission:

We are a group of radiologists, nuclear medicine physicians, gynecological cancer surgeons, gynecological oncologists, pathologists, radiation physicists and computer scientists working on a project on the diagnostic and prognostic value of FDG-PET/CT and -PET/MRI in gynecological cancer. We also aim to compare imaging biomarkers to histopathological and molecular biomarkers, and to develop a machine learning method to predict the malignant potential of ovarian lesions in MRI according to O-RADS.

TITLE OF PROPOSED RESEARCH PROJECT

Prognostic and diagnostic added value of medical imaging in staging and treatment planning of gynecological cancer (PRODIGYN)

OBJECTIVES

- We aim to prospectively 1) explore the diagnostic and prognostic potential of FDG-PET/CT and FDG-PET/MRI in cervical, endometrial, and epithelial ovarian cancer
- 2) evaluate the impact of FDG-PET/MRI on radiotherapy target delineation and subsequent side effects
- 3) to identify prognostic FDG-PET/CT and FDG-PET/MRI biomarkers for comparison with histopathological biomarkers in endometrial cancer.
- For the subgroup of patients with cervical and endometrial cancer treated with radiotherapy, we aim to evaluate early treatment response with stand-alone MRI.
- For the subset of patients with endometrial cancer undergoing sentinel node surgery, we aim to prospectively evaluate pre-operative FDG-PET/MRI and FDG-PET/CT imaging characteristics of pelvic lymph node metastases both on regional basis (imaging and histopathology match within the same anatomical lymph node region) and on patient basis (N0 or N1) in endometrial cancer, with sentinel node

histopathology as verification, to assess the potential of non-invasive imaging-based N staging.

- For the ovarian cancer dataset, we aim to develop a machine learning method trained on O-RADS (MRI) with data from the retrospective part of the PRODIGYN study, with a matching number of controls from the non-ovarian cancer cohort. In the next step, we aim to apply the machine learning method for O-RADS (MRI) on the dataset acquired in the prospective part of the PRODIGYN study and compare the performance of the machine learning method with radiologists with various experience.

APPLICANT'S DUTIES

- Learn to acquire data, to review images, to manage and analyse data, to collaborate with statisticians/clinicians/clinical scientists, to develop skills in tools and post-processing, to collaborate in writing articles, and to prepare oral/written presentations.
- Annotate ovarian lesions in MRI according to O-RADS
- Cooperate with computer scientists in the development of a machine learning model for O-RADS classification

APPLICANT'S BENEFITS

- Learn to acquire data, to review images, to manage and analyse data, to collaborate with statisticians/clinicians/clinical scientists, to develop skills in tools and post-processing, to collaborate in writing articles, and to prepare oral/written presentations.
- Participation on scientific outcomes of the project i.e. presentations to congresses or publications of papers
- Acquire machine learning skills

- Project Leader: Sara Strandberg, MD, PhD
- Members: Ulrika Ottander, MD PhD
- David Lindqvist, MD PhD
- Malin Båtsman, MD
- Kristina Sandgren, PhD
- Tommy Löfstedt, PhD