GPRC5C- or EPS8-positive EVs as PDAC biomarkers, we analyzed EVs from PDAC patient blood samples using ultracentrifugation in two different cohorts (a total of 54 PDAC patients, 32 healthy donors, and 22 pancreatitis patients) by immunoblotting. The combination of EV-associated GPRC5C and EPS8 had high accuracy, with area under the curve (AUC) values of 0.922 and 0.946 for distinguishing early-stage PDAC patients from healthy controls in the two cohorts, respectively, and could detect PDAC patients who were negative for CA19-9. Moreover, we analyzed 30 samples taken at three time points from 10 PDAC patients who underwent surgery : before surgery, after surgery, and recurrence as an early-stage model. These proteins were detected in EVs derived from preoperative and recurrence samples. These results indicated that GPRC5C- or EPS8-positive EVs were biomarkers that have the potential to detect stage I early pancreatic cancer and small recurrent tumors detected by computed tomography.

4-1.

剖検により G-CSF 産生肺多形癌と診断した原発不明がんの一例

（医学部医学科 4 年）
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（分子病理学分野）
山田　侑子、藤田　浩司、黒田　雅彦

※抄録の掲載を辞退する。

4-2.

The artificial intelligent analysis of preoperative computed tomography images contributes to highly accurate prediction of visceral pleural invasion

（社会人大学院博士課程 2 年呼吸器・甲状腺外科学分野）
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Visceral pleural invasion (VPI) is one of the poor prognostic factors of lung cancer, and we previously reported a relationship between VPI and lymph node metastasis. Predicting VPI in preoperative radiological images is essential for making a decision on the surgical approach. However radiological findings previously reported to be associated with VPI might be various for subjective judgment process. Our study aimed to explore objective radiological findings to predict VPI using artificial intelligence (AI) analysis.

In this retrospective single-center study, 416 patients with surgically resected lung cancer at Tokyo Medical University Hospital between 2010 and 2017 were enrolled. We performed AI analysis for CT images of all patients by using Synapse Vincent (Fujifilm, Japan). The software distributed 28radiological features of the tumor with each confidence score and association of the features with VPI was statistically assessed.

Of all patients, VPI was present in 281patients (68%), Clinical stage IA in 277patients (67%) and stage IB in 139patients (33%). Binary logistic regression analysis for the radiological features analyzed by AI showed serrated edge (p<0.001, Odds ratio 57.21, 95%CI 6.3-516.0) and pleural contact (p<0.001, Odds ratio 5.24, 95%CI 2.7-10.2) as statistically significant factors related with VPI.

In conclusion, our results suggested that tumors with radiological findings analyzed by the AI software were associated with VPI. Precise preoperative assessment of VPI is expected to become possible by integrating the AI software analysis.

4-3.

Development of multiple AI pipelines that predict NAC response of breast cancer using H&E-stained tissues

（社会人大学院博士課程 3 年分子病理学分野）
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In this study, we attempted to use artificial intelligence（AI）to predict the effect of preoperative chemotherapy from hematoxylin and eosin images of pathological tissue obtained from needle biopsies prior to chemotherapy. Application of AI to pathological images typically use a single machine-learning model such as support vector machines（SVM）or deep convolutional neural networks（CNN）. However, in this study, we proposed a novel pipeline system with three independent models, each focusing on different features of cancer atypia. There has been no reported case of a pathological diagnosis system using such a pipeline. We believe that this AI pipeline system will contribute to the adoption of personalized medicine in NAC therapy for breast cancer.

4-4.

The clinicopathological role of autonomic nerves in salivary duct carcinoma

（社会人大学院博士課程 3 年人体病理学分野）
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※抄録の掲載を辞退する。

4-5.

Prognostic analysis of patients with lung metastasis of advanced colorectal cancer using artificial intelligence

（大学院博士課程 4 年消化器小児外科学分野）
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【Background】 In colorectal cancer patients with lung metastases who undergo pulmonary resection, lung cancer recurrence and further metastases are often observed. Hence, predictive factors to identify those who will benefit from pulmonary resection are required. Here, to predict the efficacy of local treatment for lung metastases, pathological analysis was performed, and results were compared between lung metastases and primary lesions using artificial intelligence.

【Subjects】 A total of 112 patients with lung metastases of colorectal cancer from 1990 to 2020（61 patients with resectable metastases［29 recurred within 3 years, 32 were recurrence-free for 3 years］, and 47 with unresectable metastases）were analyzed.

【Methods】 In analysis A, images were randomly selected from lung metastases, and HE slides were digitized and visualized as tissue structures. Necrotic, stroma, and lymphocyte aggregates were excluded and only nuclei were extracted. After measuring features using Cell Profiler software, feature information was analyzed using Cell Feature Level Co-Occurrence Matrix to obtain 960 features. Lung metastases were used as training data and primary tumors as test data. Machine learning was used for analysis. In analysis B, HE slides were digitized, and cancer regions were annotated. For lung metastases, a model was constructed using deep learning to determine whether recurrence occurred, and was adapted to the primary tumor. Finally, a support-vector machine was used to determine whether there was recurrence. Analysis A was performed first, and for patients with a difference in likelihood ratio of less than 0.1,