

# Justification for the creation of intelligent programs for early diagnosis, lung cancer phenotyping and treatment effectiveness assessment

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**Conflict of interest:** none

**BACKGROUND.** Ordinary DICOM viewers used in practical medicine (Vitrea, EFilm, K-Pacs, etc.) allow only densitometric researches, which does not give a complete picture of the histological structure of the investigated tissues. Digital software processing of computed tomography (CT) data helps to investigate in detail the morphofunctional state of tissues and formations.

**OBJECTIVE.** In view of the digital software processing of CT data, to justify the possibility of creating intelligent programs based on convolutional neural networks for early diagnostics, phenotyping and control of efficiency of lung cancer treatment.

**MATERIALS AND METHODS.** The retrospective analysis of the data of 23 patients who were on treatment at the SI “National scientific center of phthiology, pulmonology and allergology named after F.G. Yanovsky of the NAMS of Ukraine”. On the eve of operative treatment the patients underwent a full complex of inspections, including a CT scan. Digital software processing of CT data was conducted taking into account the results of immunohistochemical and pathistological inspections of removed tumours using the Dragonfly program.

**RESULTS.** Differences in the histograms of various immunohistochemical forms of lung cancer have been revealed, that allows to create intelligent systems based on convolutional neural networks. It will help to conduct early diagnostics, phenotyping and control of efficiency of the personalized treatment of patients with lung cancer.

**KEY WORDS:** computed tomography, intelligent programs, convolutional neural networks, segmentation histogram, lung cancer.

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