

Radiomics imaging biomarkers from the perspective of tumor biology

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Stellingen:

1. The classification of radiomics-based hypoxia signature proposed in this PhD thesis is a critical first step for performing interventional trials on clinical behavior and prognosis of hypoxic tumors (This PhD thesis, Chapter...)
2. Predictive models for worse prognosis in head and neck cancer patients (???) can include the change of *[18F] HX4 uptake* measured on *[18F] HX4 PET*, early during treatment, as an independent predictor for the need of intensified treatment. (This PhD thesis, Chapter...)
3. Radiomic features from the peritumoral regions of head and neck cancer patients are unlikely to predict the time to overall survival, locoregional recurrence and distant metastasis. (This PhD thesis, Chapter...)
4. Large cell neuroendocrine carcinoma (LCNEC) appears to have radiological characteristics of both small cell lung cancer (SCLC) and non small cell lung cancer (NSCLC) irrespective of Retinoblastoma protein loss, compatible with the SCLC-like subtype. Expert imaging interpretation, semantic features and the radiomics signature proposed in this thesis designed to differentiate between SCLC and NSCLC were unable to separate molecular LCNEC subtypes, which underscores that LCNEC is a unique disease. (This PhD thesis, Chapter...)
5. Combatting batch effects (Combat) makes it possible to pool radiomic features from different CT protocols. This method appears promising to address the center effect in multicenter radiomic studies and to possibly raise the statistical power of those studies (Orhac et al., *Radiology* 2019; 291:53–59)
6. In the future, wide access to radiomics data via distributed learning will allow regular updates of the studied signatures and leverage their accuracy and applicability in the development of new treatment modalities (Bogowicz et al. *Sci Rep.* 2020; 10: 4542.)
7. As tumors are increasingly treated based on their specific molecular profile, imaging biomarkers should become an essential diagnostic tool for selecting appropriate therapies and assessing their response to treatment. Integration of imaging biomarkers into clinical trials and practice will require a concerted effort by all involved parties, including oncologists, radiologists, the pharmaceutical industry, imaging companies, and government. In the era of limited government funding, both the pharmaceutical industry and the imaging industry will need to contribute to the support of imaging biomarkers in cancer trials, realizing that in the long run their investments will pay dividends in overall cost savings and in new drugs and new imaging approaches brought to market. (Farwell et al. *JAMA Oncol.* 2015;1(4):421–422)

8. "Quality is doing it right when no one is looking" —Henry Ford
9. "This is a disease [COVID-19] that we will be studying for decades and decades to come, just by the very nature of its unique presentations, all the different organs it affected, how it impacted on our immune systems and what then happened because of the dysfunction of our immune systems brought on by this virus.—CBS News Radio, Jul 22, 2020
10. "Mother Nature has the upper hand, and she is using the trappings of modern life—air travel, burgeoning population and low-income country megacities, encroachment on natural habitats, and an interconnected global just-in-time delivery system—to extend her reach." —Time op-ed, with Mark Olshaker, Feb 4, 2020, regarding 2019-nCoV
11. "Some people call this artificial intelligence, but the reality is this technology will enhance us. So instead of artificial intelligence, I think we'll augment our intelligence." —Ginni Rometty
12. At the end an object of conquest is to avoid doing the same thing as the conquered—Alexander the Great