radiomics

INSIGHT-BASED DECISION MAKING

An Introduction to Oncology

November 2022

Radiomics, who are we?

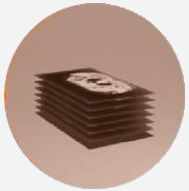
Radiomics is an AI powered research organization providing image-based insights to support clinical and research decision making.

Radiomics specializes in medical image analysis and data mining using a broad spectrum of AI technologies. Our R&D team is also continuously working on new solutions in collaboration with multiple national and international partners.

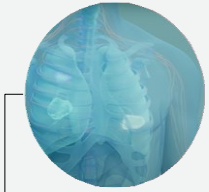
Our final goal is optimizing pharmaceutical and biotech companies' clinical trials and drug development studies and providing clinicians with a patient-centered approach based on personalized medicine.

How does Radiomics work?

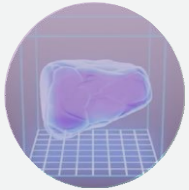
1. **Data collection & organization**



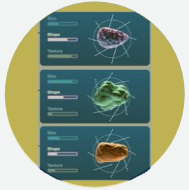
2. **Identification of regions of interest**



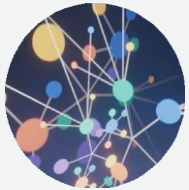
3. **3D segmentation of regions of interest**



4. **Quantification & feature extraction**



5. **AI modelling and link to biology**



- GDPR
- ISO 13485
- QMS

Disease and treatment characterization

- Analysis performed in a few minutes
- 3D/4D
- Non-invasive
- Scalable

What questions can *Radiomics* help to answer?

Phase 1

Detecting early signals

- Is the drug having an effect on specific lesions?
- What are the most promising indications to take forward?
- Is the drug safe?
- How does response change with dose escalation?

Phase 2

Optimising clinical trials

- Is the mechanism of action aligned with my expectations?
- Are there response differences between different treatment arms?
- What is the phenotype of responders?

Phase 3

Powering for success

- How can treatment insights be used to ensure a fair and unbiased trial?
- Is there a way to predict response at baseline or early stages?
- Is there an opportunity for an imaging companion diagnostic to optimise impact

Post-market

Going beyond

- What additional evidence can be generated for the treatment?
- Can the insights derived from the treatment be applied to other indications?
- Can the treatment protocol be optimised?

Radiomics features

- Lesion response to treatment can manifest in many different ways beyond only change in unidimensional diameter (RECIST).
- Radiomics features relating to size/volume, shape/spikiness, or texture/heterogeneity can be more sensitive to changes that might indicate response.

Using Radiomics to detect biomarkers

Using tissue/liquid biopsy:

Invasive
Time consuming
Expensive
Doesn't capture intratumour heterogeneity

Imaging has been proven useful in identifying **genetic mutations** and **other response biomarkers** for cancer treatments

Using imaging:

Readily available data
Non-invasive
Fast and cost-effective
Captures entire tumour in 3D/4D
Can be repeated and scaled up

PD-L1 [1,2] | EGFR | KRAS [5] | ALK [6,7] | HPV [8] | Hypoxia [9] | CD8 [10,11] | Others

[1] Jiang et al. Acad Radiol 2020
[2] Yoon et al. Thorac. Cancer 2020
[3] Hong et al. Front. Oncol. 2020
[4] Rossi et al. Cancer Res. 2021
[5] Yang et al. Eur. Radiol. 2018
[6] Chang et al. Front. Oncol. 2021
[7] Song et al. Front. Oncol. 2020
[8] Leijenaar et al. Br J Radiol 2018
[9] Sanduleanu et al. Radiother Oncol. 2020
[10] Sun et al. J Immunother Cancer 2020
[11] Sun et al. Lancet Oncol. 2018

More efficient patient selection

Our Solution

Pre-screening tool with radiomics through standard medical imaging analysis.

What to improve

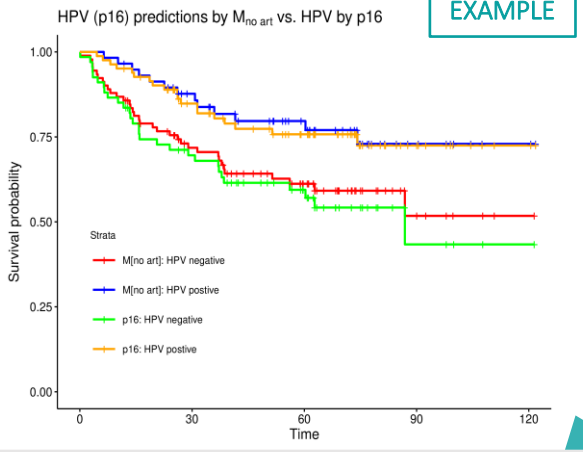
Readily available data;
Non-invasive testing;
Captures tumour heterogenity;
Faster detection of biomarkers.

Current Solution

Tissue & Liquid biopsy.

Development and validation of a radiomic signature to predict HPV (p16) status from standard CT imaging: a multicenter study

EXAMPLE

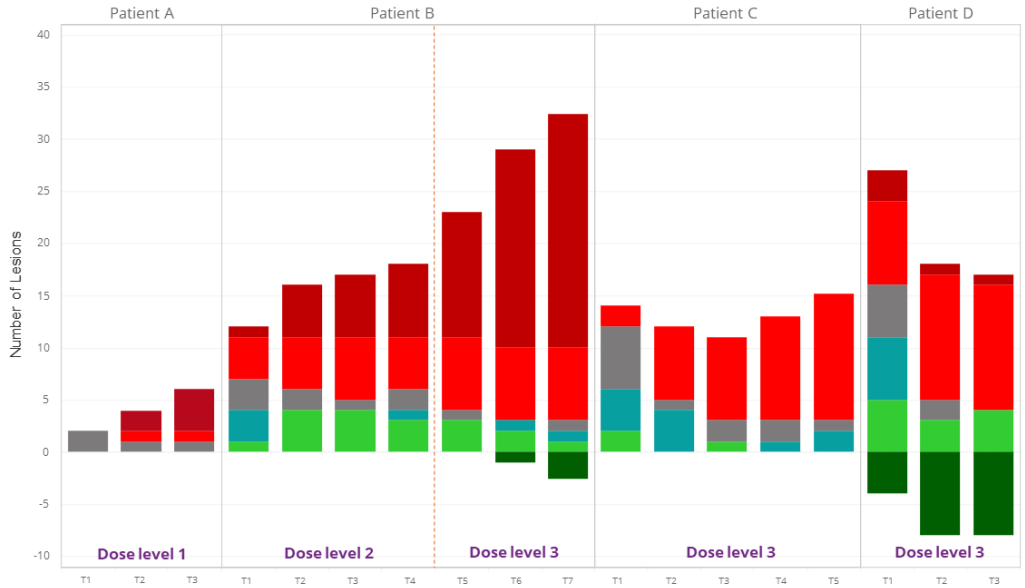


Possible to get the same clinically actionable molecular information regarding HPV status using a CT scan as with the biological test (p16 staining).

[1] Leijenaar et al. Br J Radiol 2018

Dose escalation analysis

- Changes in lesion characteristics can be analysed as a function of dose level using a modelling approach to look for the dose level that maximises efficacy without unnecessary toxicity.



EXAMPLE

In a real project, considering number of new lesions from baseline and dose levels showed that the highest dose level (level 3) appeared to have the most positive impact on number of lesions

Category
- Appearing
- Progressive
- Stable
- Potentially Responsive
- Responsive
- Disappearing

Why *Radiomics*?

Publications

Numerous radiomics publications in high impact journals such as Nature Review and Clinical Oncology.

Experience

Our scientists are the first to coin the term radiomics and have unparalleled experience in the field of radiomics analysis.

Achievements

Optimization of our clients' work through innovative solutions such as COVIA and our radiomics signatures.

IP Portfolio

Comprehensive portfolio with both granted and pending international (EU/US) patents.

People

We have a very multicultural team with specialties in a broad range of domains.

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