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[18F]FDG PET immunotherapy radiomics signature (iRADIOMICS) predicts response of non-small-cell lung cancer patients treated with pembrolizumab

Damijan Valentinuzzi, Martina Vrankar, Nina Boc, Valentina Ahac, Ziga Zupancic, Mojca Unk, Katja Skalic, Ivana Zagar, Andrej Studen, Urban Simoncic, Jens Eickhoff, Robert Jeraj

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TABLE S1. Definition of radiomics features

Feature	Definition	Description
Volume	$V_{vox} \cdot n_{vox}$	Also called Metabolic Tumour Volume (MTV). It represents the volume of the delineated lesion.
SUV_{max}	$\max_{j=1 \to n_{vox}} SUV(j)$	Maximum SUV within the lesion.
SUV_{total}	$V_{vox} \cdot \sum_{j=1}^{n_{vox}} SUV(j)$	Also called Total Lesion Glycolysis (TLG). It represents the sum of SUV values within the lesion (multiplied by the voxel volume).
Sum entropy	$-\sum_{k=2}^{2N_g} GLCM_{x+y}(k) \cdot log\left(GLCM_{x+y}(k)\right)$	Also called GLCM Sum Entropy. It is a measure of disorder in relation to the distribution of the sum of co-occurring pixels in the image.[42]
Entropy-GLCM	$-\sum_{i=1}^{N_g}\sum_{j=1}^{N_g} GLCM(i,j) \cdot \log\left(GLCM(i,j)\right)$	It is a measure of the degree of disorder among pixels in the image. Entropy-GLCM should be lower for images with lower number of grey levels.[42]
Difference entropy	$-\sum_{k=0}^{N_g-1} GLCM_{x-y}(k) \cdot log\left(GLCM_{x-y}(k)\right)$	Also called GLCM Difference Entropy. It is a measure of disorder in relation to the distribution of the difference of co-occurring pixels in the image.[42]
Small Run Emphasis (SRE)	$\frac{1}{N_{r,tot}}\sum_{i=1}^{N_g}\sum_{j=1}^{N_{r,max}} \frac{GLRLM(i,j)}{j^2}$	Also called Short Run Emphasis or Small Zone-Size Emphasis. It divides each run length value by the length of the run squared, emphasizing short runs. SRE should be higher for finer textures.[43]
Run percentage	$\frac{N_{r,tot}}{N_p}$	Also called Zone-Size percentage. It is a ratio of the total number of runs to the total number of possible runs if all runs had a length of one. Run percentage should be lower for pictures with more linear structure.[43]

GLCM(i,j) = (i,j)th entry in the normalized grey level co-occurrence matrix, $GLCM_{x+y}(k) = \sum_{i+j=k} GLCM(i,j); k \in \{2,3,\dots,2N_g\}$, $GLCM_{x-y}(k) = \sum_{|i-j|=k} GLCM(i,j); k \in \{0,1,\dots,N_g-1\}$; *GLRLM(i,j)* = Grey Level Run Length matrix (also called Grey Level Zone-Size Matrix) representing a run-length *j* and grey level *I*; N_g = number of distinct grey levels in the patch; n_{vox} = total number of voxels in the region of interest (ROI); *SUV (j)* = standardized uptake value of j-th voxel; $N_{r\,tot}$ = the total number of runs in the patch; $N_{r,max}$ = maximum run length; N_p = the total number of pixels in the patch; V_{vox} = volume of one voxel; SUV_{max} = maximum standardized uptake values; SUV_{total} = total SUV

TABLE S2. Coefficients of iRADIOMICS logistic models obtained by logistic regression. Coefficient value (β) with 95% confidence interval (CI), standard error (SE), the result of Wald χ^2 test and p-value are reported for each model variable. Before the analysis, all features were normalized into z-scores

Univariate logistic model (iRADIOMICS)				
Variable	β (95% CI)	SE	Wald χ^2	p-value
Intercept	0.317 (-0.677–1.51)	0.534	0.35	0.553
Small Run Emphasis (SRE)	1.73 (0.525–3.59)	0.755	5.23	0.022
Multivariate logistic model (iRADIOMICS)				
Variable	β (95% CI)	SE	Wald χ^2	p-value
Intercept	0.896 (-0.425–3.15)	0.847	1.12	0.290
Small Run Emphasis (SRE)	3.23 (1.02–7.46)	1.57	4.26	0.039
Difference Entropy	-1.26 (-3.3–0.0894)	0.818	2.36	0.124

GLCM = Grey-Level Co-occurrence Matrix; SUV_{max} = maximum standardized uptake values; SUV_{total} = total SUV

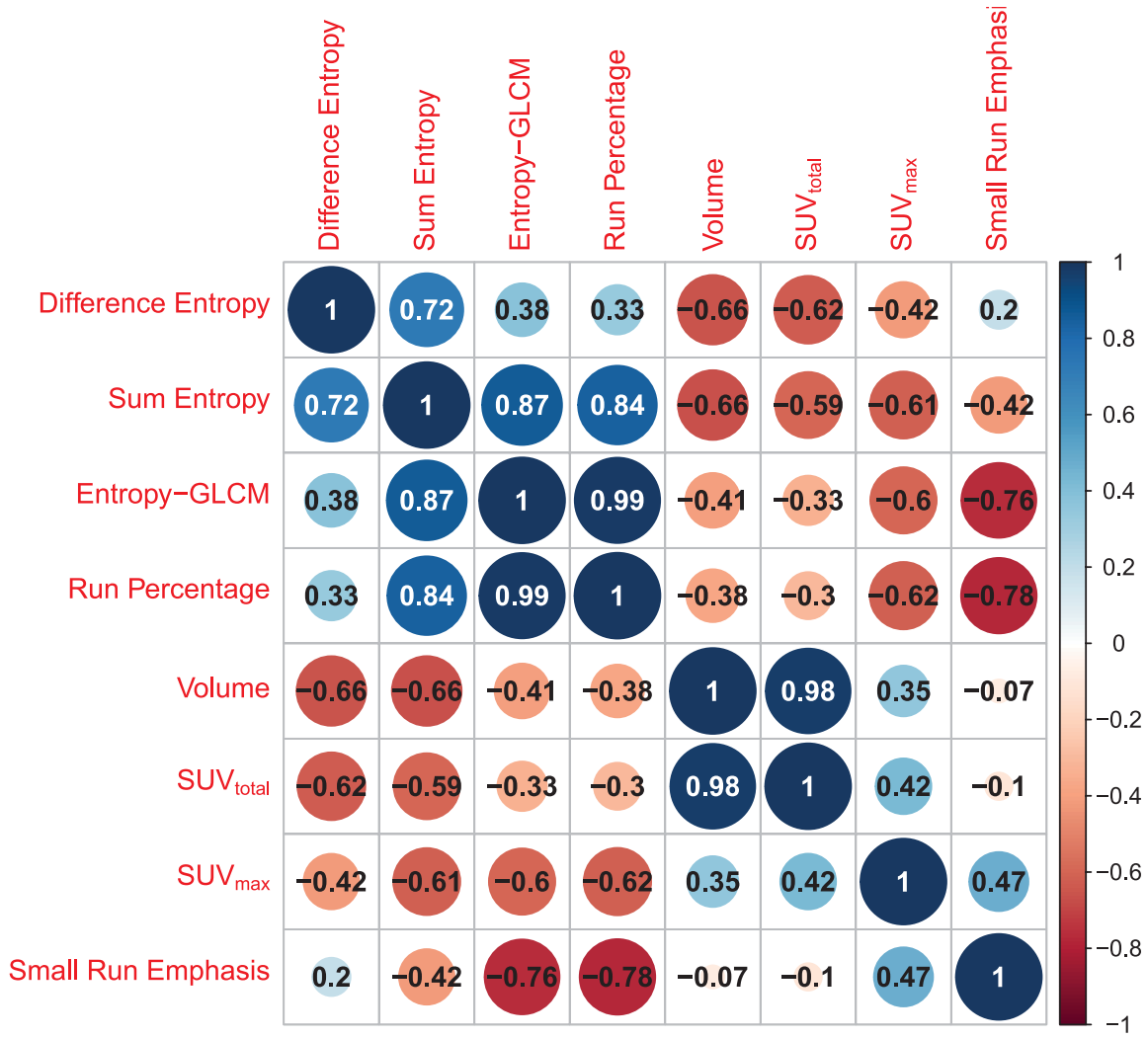

FIGURE S1. Correlation matrix of all radiomics features. Pearson correlation coefficient (ϱ) was calculated to assess the correlation between the radiomics features.