

Central Lancashire Online Knowledge (CLOK)

Title	Spectral classification for diagnosis involving numerous pathologies in a complex clinical setting: A neuro-oncology example
Type	Article
URL	https://clock.uclan.ac.uk/id/eprint/23933/
DOI	https://doi.org/10.1016/j.saa.2018.07.078
Date	2018
Citation	Bury, Danielle Elizabeth, Medeiros-De-morais, Camilo De Ielis ORCID icon ORCID: 0000-0003-2573-787X, Paraskevaidi, Maria, Ashton, Katherine M., Dawson, Timothy and Martin, Francis L (2018) Spectral classification for diagnosis involving numerous pathologies in a complex clinical setting: A neuro-oncology example. <i>Spectrochimica Acta. Part A: Molecular and Biomolecular Spectroscopy</i> , 206. pp. 89-96. ISSN 1386-1425
Creators	Bury, Danielle Elizabeth, Medeiros-De-morais, Camilo De Ielis, Paraskevaidi, Maria, Ashton, Katherine M., Dawson, Timothy and Martin, Francis L

It is advisable to refer to the publisher's version if you intend to cite from the work.
<https://doi.org/10.1016/j.saa.2018.07.078>

For information about Research at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLOK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>

Supplementary Information

Spectral classification for diagnosis involving numerous pathologies in a complex clinical setting: a neuro-oncology example

Danielle Bury^a, Camilo L M Morais^a, Maria Paraskevaïdi^a, Katherine M Ashton^b, Timothy P Dawson^b, Francis L Martin^a

^aSchool of Pharmacy and Biomedical Sciences, University of Central Lancashire, Preston PR1 2HE, UK

^bDepartment of Neuropathology, Royal Preston Hospital, Lancashire Teaching Hospitals NHS Trust, Preston PR2 9HT, UK

Corresponding Author: Professor Francis L Martin, School of Pharmacy and Biomedical Sciences, University of Central Lancashire, Preston PR1 2HE, UK; Tel.: +44(0)1772 896482; Email: flmartin@uclan.ac.uk

Table S1: A one-way ANOVA showing the differences between each of the normal, high-grade (HG) and low-grade (LG) glioma groups. Significance level $p < 0.05$.

Tukey's multiple comparisons test	Mean Difference	95% CI of difference	Adjusted P -value
Normal vs. HG	0.05	0.05 to 0.06	<0.0001
Normal vs. LG	0.01	0.01 to 0.02	<0.0001
HG vs. LG	-0.04	-0.04 to -0.03	<0.0001

Table S2: Results of the one-way ANOVA showing statistically significant comparisons between each group. LG, low-grade glioma; HG, high-grade glioma; Mets, metastasis to brain. Significance level $p < 0.05$.

Tukey's multiple comparisons test	Mean Difference	95% CI of difference	Adjusted P -value
Normal vs. HG	0.05	0.05 to 0.06	<0.0001
Normal vs. LG	0.01	0.01 to 0.02	<0.0001
Normal vs. Meningioma	0.03	0.03 to 0.04	<0.0001
Normal vs. Mets	0.02	0.02 to 0.03	<0.0001
HG vs. LG	-0.04	-0.04 to -0.03	<0.0001
HG vs. Meningioma	-0.02	-0.03 to -0.02	<0.0001
HG vs. Mets	-0.03	-0.04 to -0.02	<0.0001
LG vs. Meningioma	0.02	0.01 to 0.02	<0.0001
LG vs. Mets	0.01	0.00 to 0.01	0.0005
Meningioma vs. Mets	-0.01	-0.01 to -0.00	<0.0001

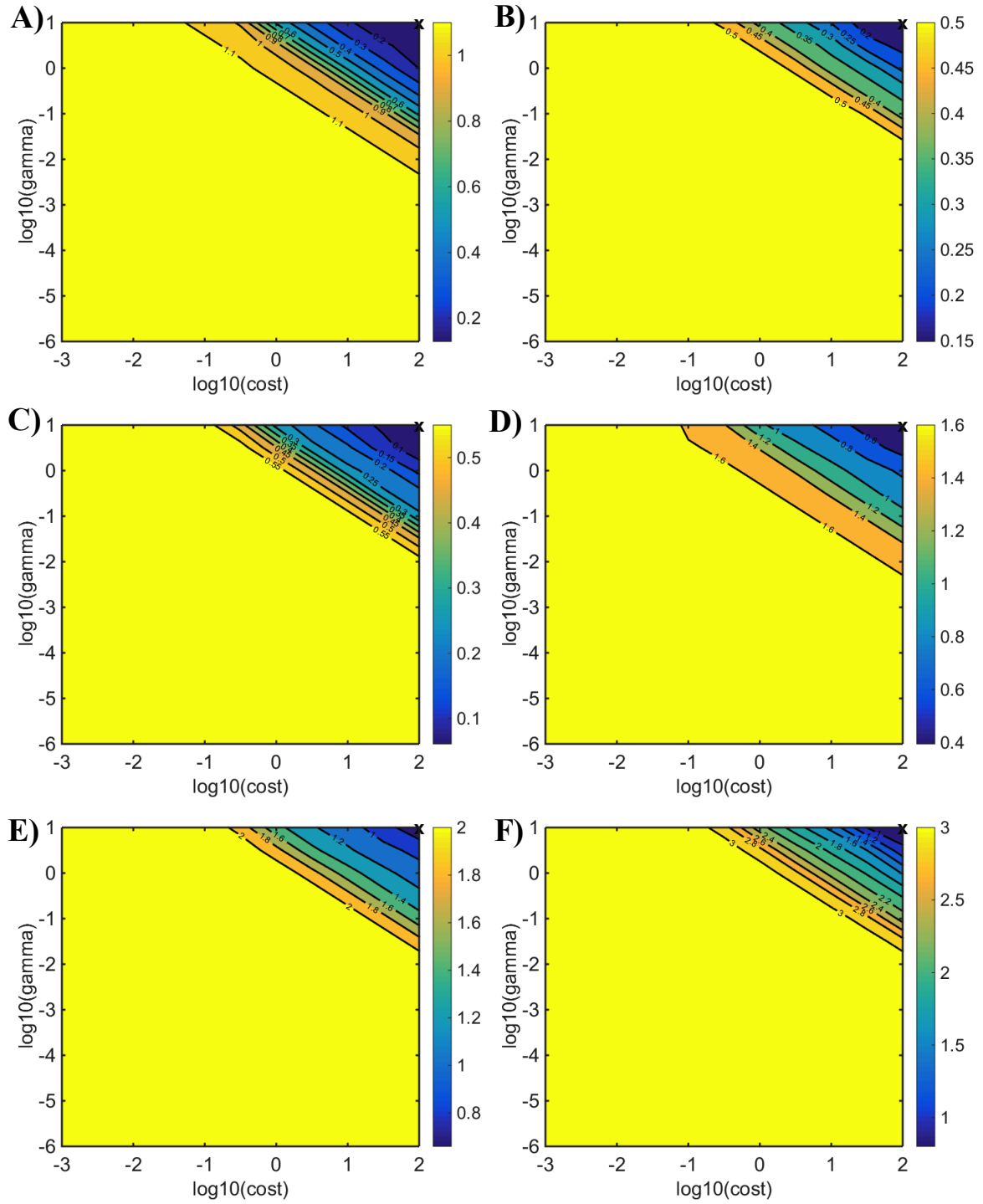


Figure S1: SVM optimization cost for (A) control vs. low-grade vs. high-grade gliomas; (B) control vs. meningioma; (C) control vs. metastasis; (D) control vs. colorectal adenocarcinoma vs. lung adenocarcinoma vs. melanoma; (E) control vs. low-grade glioma vs. high-grade glioma vs. meningioma vs. and metastasis; (F) control vs. low-grade glioma vs. high-grade glioma vs. meningioma vs. melanoma metastasis vs. colorectal adenocarcinoma metastasis vs. lung adenocarcinoma metastasis.

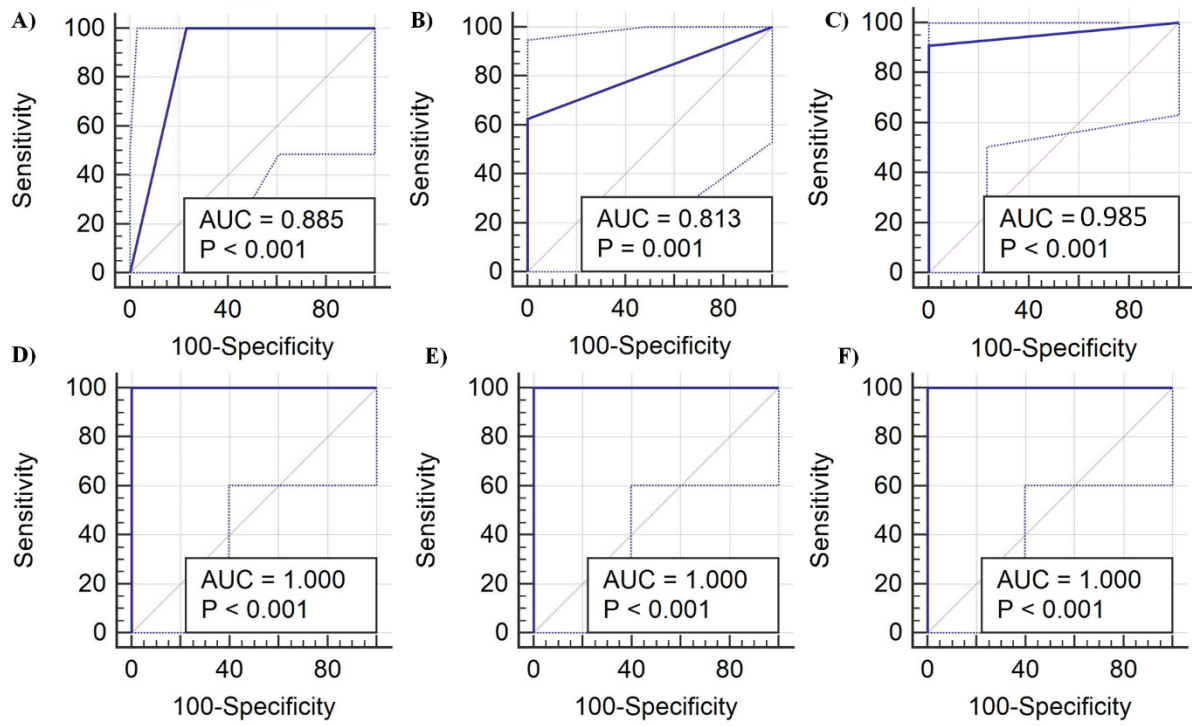


Figure S2: ROC curves for PCA-LDC in control (A) vs. low-grade (B) vs. high-grade (C) gliomas; and SVM in control (D) vs. low-grade (E) vs. high-grade (F) gliomas.

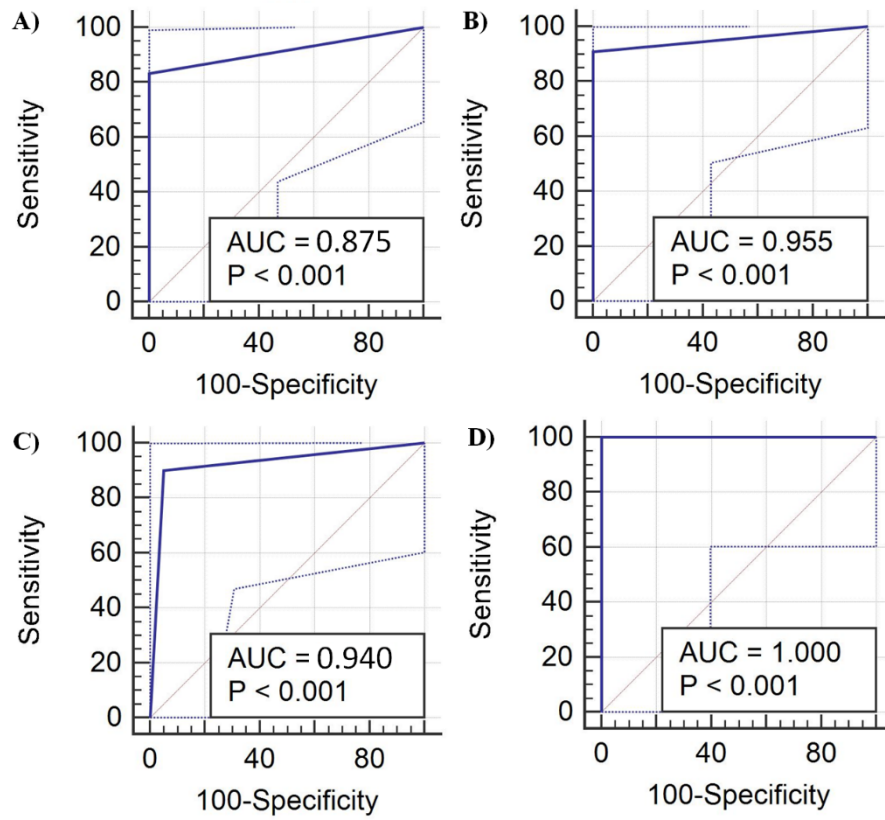


Figure S3: ROC curves for PCA-LDC (A) and SVM (B) in control vs. meningioma; and PCA-LDC (C) and SVM (D) in control vs. metastasis.

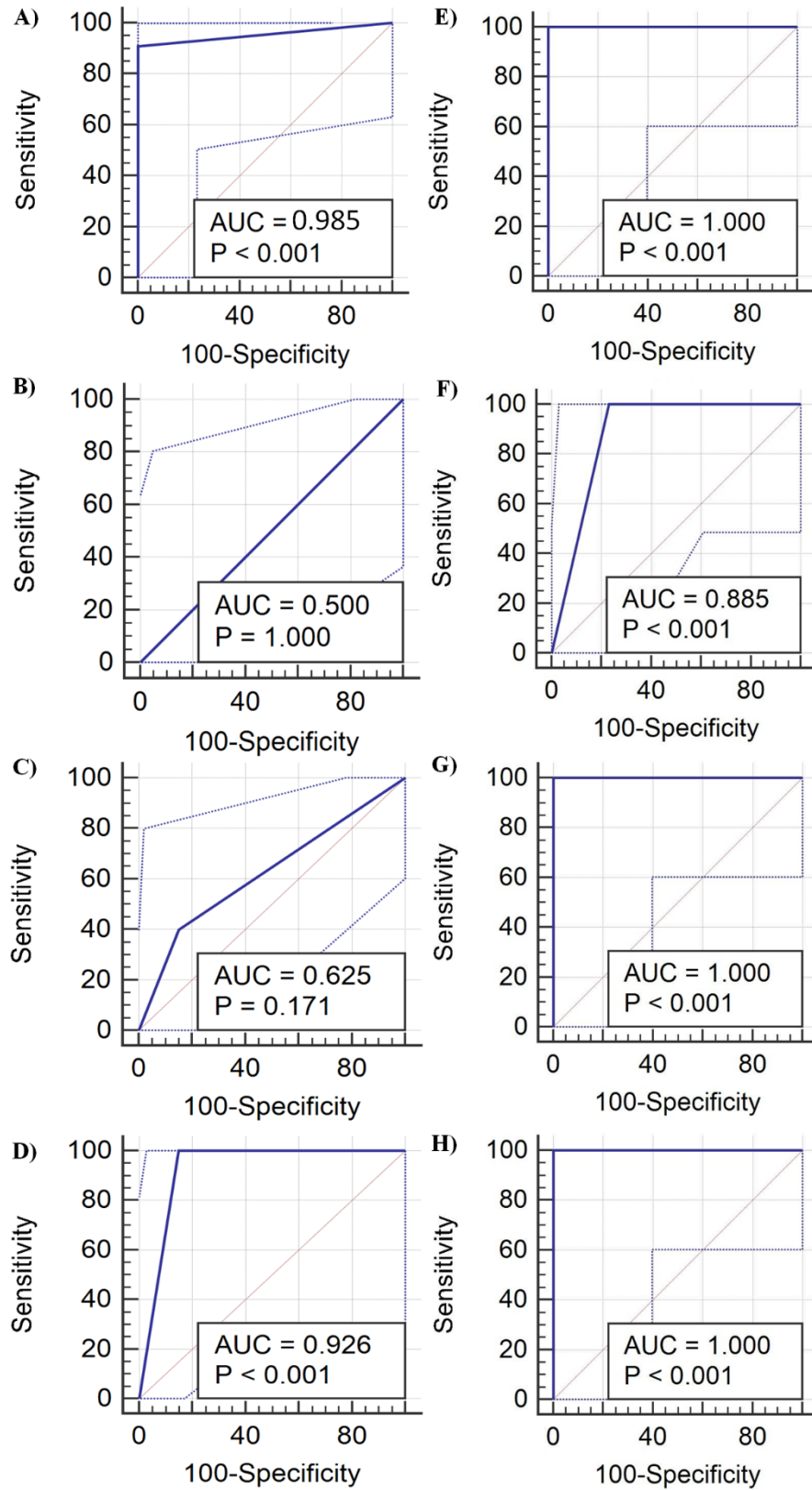


Figure S4: ROC curves for PCA-LDC in control (A), colorectal adenocarcinoma (B), lung adenocarcinoma (C), melanoma (D); and SVM in control (E), colorectal adenocarcinoma (F), lung adenocarcinoma (G), melanoma (H).

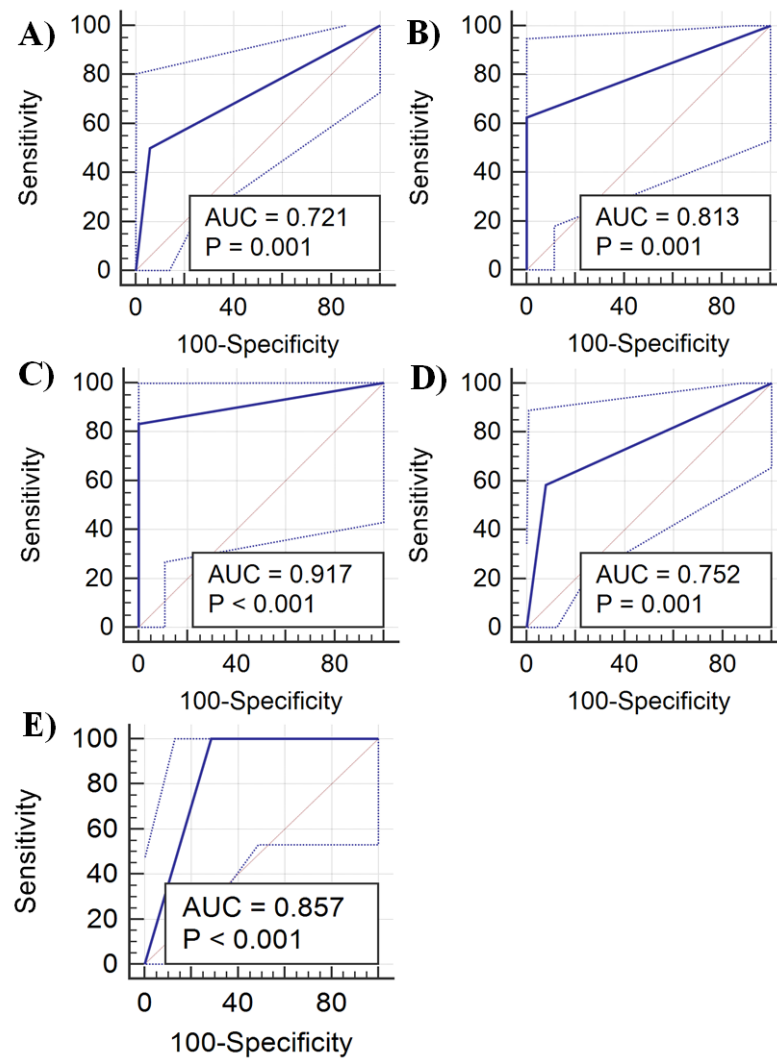


Figure S5: ROC curves for PCA-LDC in control (A), high-grade glioma (B), low-grade glioma (C), meningioma (D) and metastasis (E).

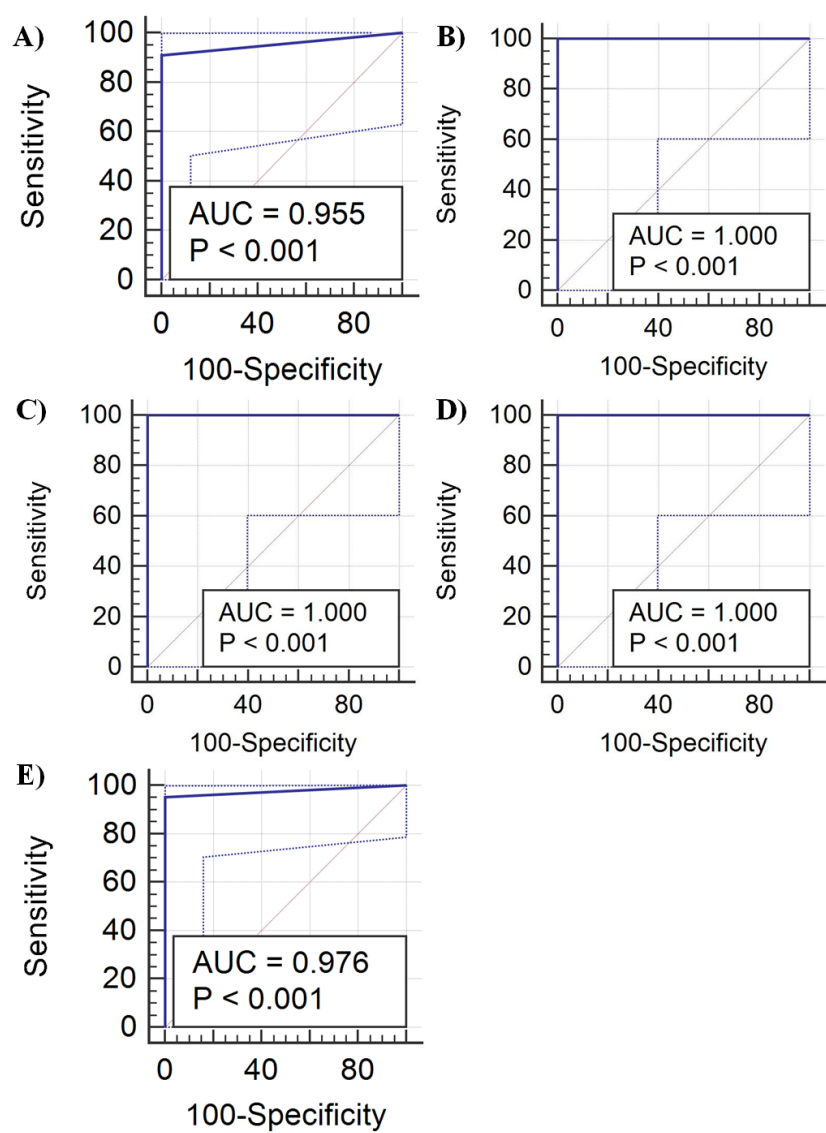


Figure S6: ROC curves for SVM in control (A), high-grade glioma (B), low-grade glioma (C), meningioma (D) and metastasis (E).

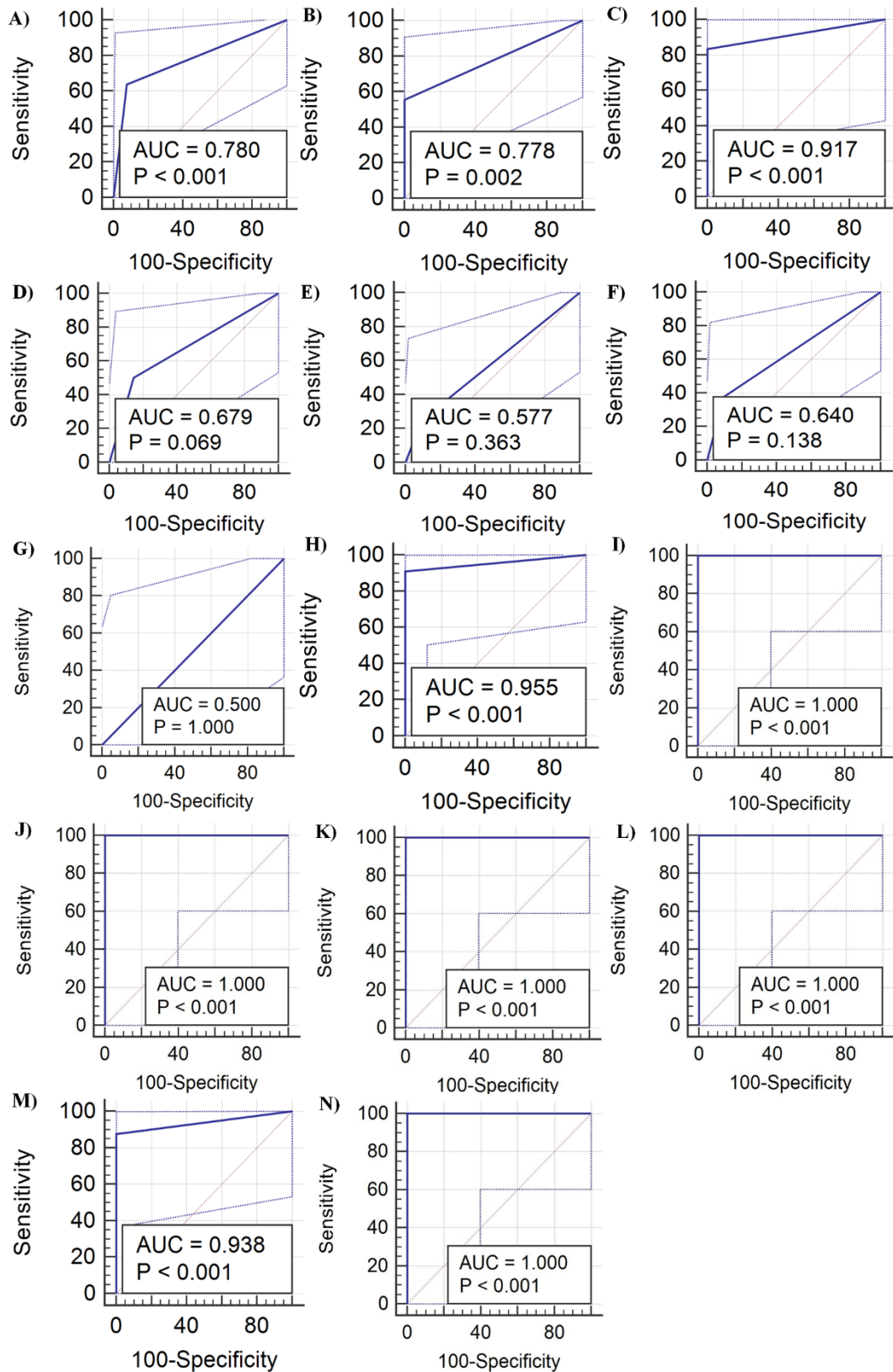


Figure S7: ROC curves for PCA-LDC in (A) control, (B) low-grade glioma, (C) high-grade glioma, (D) meningioma, (E) melanoma metastasis, (F) colorectal adenocarcinoma metastasis, (G) lung adenocarcinoma metastasis; and SVM in (H) control, (I) low-grade glioma, (J) high-grade glioma, (K) meningioma, (L) melanoma metastasis, (M) colorectal adenocarcinoma metastasis, (N) lung adenocarcinoma metastasis.