## **Supplementary Table S 1**

Layer	Kernel size	Kernels	Stride	Output size
Input				3 x 64 x 64
Conv 1a	3x3	16	1	16 x 62 x 62
Conv 1b	2x2	16	2	16 x 31 x 31
Conv 2a	3x3	16	1	16 x 29 x 29
Conv 2b	3x3	16	2	16 x 14 x 14
Conv 3a	3x3	16	1	16 x 12 x 12
Conv 3b	4x4	16	2	16 x 5 x 5
Fc-conv	5x5	2	-	2

Table S 1. Primary neural network architecture.

The primary network used in this study was adapted from Janowczyk and Madabhushi (1). This fully-convolutional architecture is composed of alternating convolutional, batch normalization (2), and Rectified Linear Unit (ReLU) activation layers (3, 4). The network has approximately 13,500 learnable parameters.

## SUPPLEMENTAL REFERENCES

- 1. Janowczyk A, Madabhushi A. Deep learning for digital pathology image analysis: A comprehensive tutorial with selected use cases. J Pathol Inform. 2016;7:29.
- 2. loffe S, Szegedy C. Batch normalization: accelerating deep network training by reducing internal covariate shift. Proceedings of the 32nd International Conference on International Conference on Machine Learning Volume 37; Lille, France. 3045167: JMLR.org; 2015. p. 448-56.
- 3. Dahl GE, Sainath TN, Hinton GE, editors. Improving deep neural networks for LVCSR using rectified linear units and dropout. 2013 IEEE International Conference on Acoustics, Speech and Signal Processing; 2013 26-31 May 2013.
- 4. Nair V, Hinton GE. Rectified linear units improve restricted boltzmann machines. Proceedings of the 27th International Conference on International Conference on Machine Learning; Haifa, Israel. 3104425: Omnipress; 2010. p. 807-14.
- 5. Krizhevsky A, Sutskever I, Hinton GE. ImageNet Classification with Deep Convolutional Neural Networks. Advances In Neural Information Processing Systems. 2012:1-9.
- 6. Szegedy C, Wei L, Yangqing J, Sermanet P, Reed S, Anguelov D, et al., editors. Going deeper with convolutions. 2015 IEEE Conference on Computer Vision and Pattern Recognition (CVPR); 2015 7-12 June 2015.
- 7. He K, Zhang X, Ren S, Sun J. Deep Residual Learning for Image Recognition. arXiv e-prints. 2015;abs/1512.03385.
- 8. Orlov N, Shamir L, Macura T, Johnston J, Eckley DM, Goldberg IG. WND-CHARM: Multi-purpose image classification using compound image transforms. Pattern Recognit Lett. 2008;29(11):1684-93.