Table 1: Correlation of DNp73 expression and clinical characteristics in biopsies of rectal cancer patients.

*>* 67

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristics | Weak (%) | Strong (%) | *p*-value |
| Gender |  |  | 0.097 |
| Male | 26 (46) | 30 (54) |  |
| Female | 26 (63) | 15 (37) |  |
| Age  *≤* 67 | 20 (47)  32 (59) | 23 (53)  22 (41) | 0.211 |
| TNM stage |  |  | 0.059 |
| I | 17 (55) | 14 (45) |  |
| II | 18 (67) | 9 (33) |  |
| III | 11 (35) | 20 (65) |  |
| IV | 6 (75) | 2 (25) |  |
| Diﬀerentiation |  |  | 0.221 |
| Good | 3 (60) | 2 (40) |  |
| Moderate | 40 (52) | 37 (48) |  |
| Poor | 3 (50) | 3 (50) |  |
| Unknown | 6 (67) | 3 (33) |  |
| Surgical type |  |  | 0.743 |
| Rectal amputation | 26 (55) | 21 (45) |  |
| Abdominoperineal | 26 (52) | 24 (48) |  |
| Local recurrence |  |  | 0.250 |
| Yes | 6 (40) | 9 (60) |  |
| No | 46 (56) | 36 (44) |  |
| Distant metastasis |  |  | 0.333 |
| Yes | 17 (47) | 19 (53) |  |
| No | 35 (57) | 26 (43) |  |
| Dead |  |  | 0.467 |
| Yes | 16 (48) | 17 (52) |  |
| No | 36 (56) | 28 (44) |  |

Table 2: Correlation of DNp73 expression in surgically resected tumors and clinical charac- teristics in rectal cancer patients without preoperative radiotherapy (pRT) or with pRT.

DNp73 expression in patients

with pRT (%) without pRT (%)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Characteristics | Weak | Strong | *p*-value | Weak | Strong | *p*-value |
| Gender |  |  | 0.871 |  |  | 0.233 |
| Male | 18 (50) | 18 (50) |  | 21 (49) | 22 (51) |  |
| Female | 11 (48) | 12 (52) |  | 12 (35) | 22 (65) |  |
| Age  *≤*67 | 11 (38)  18 (44) | 11 (38)  19 (46) | 0.920 | 15 (45)  18 (41) | 18 (55)  26 (59) | 0.690 |
| TNM stage |  |  | 0.999 |  |  | 0.217 |
| I | 8 (50) | 8 (50) |  | 7 (33) | 14 (67) |  |
| II | 10 (48) | 11 (52) |  | 8 (42) | 11 (58) |  |
| III | 9 (50) | 9 (50) |  | 18 (53) | 16 (47) |  |
| IV | 2 (50) | 2 (50) |  | 0 (0) | 3 (100) |  |
| Diﬀerentiation |  |  | 0.213 |  |  | 0.272 |
| Good | 0 (0) | 3 (100) |  | 1 (20) | 4 (80) |  |
| Moderate | 20 (53) | 18 (47) |  | 27 (48) | 29 (52) |  |
| Poor | 9 (50) | 9 (50) |  | 5 (31) | 11 (69) |  |
| Surgical type |  |  | 0.472 |  |  | **0.021** |
| Rectal amputation | 9 (43) | 12 (57) |  | 23 (55) | 19 (45) |  |
| Abdominoperineal | 20 (53) | 18 (47) |  | 10 (29) | 25 (71) |  |
| Local recurrence |  |  | **0.042** |  |  | 0.692 |
| Yes | 0 (0) | 4 (100) |  | 8 (47) | 9 (53) |  |
| No | 29 (53) | 26 (47) |  | 25 (42) | 35 (58) |  |
| Distant metastasis |  |  | 0.341 |  |  | 0.893 |
| Yes | 10 (42) | 14 (58) |  | 13 (42) | 18 (58) |  |
| No | 19 (54) | 16 (46) |  | 20 (43) | 26 (57) |  |
| Dead |  |  | 0.207 |  |  | 0.946 |
| Yes | 8 (38) | 13 (62) |  | 13 (43) | 17 (57) |  |
| No | 21 (55) | 17 (45) |  | 20 (43) | 27 (57) |  |

*>*67

Table 3: Prediction of DNp73 in biopsies taken before surgery from rectal cancer patients without preoperative radiotherapy.

|  |  |  |  |
| --- | --- | --- | --- |
| CNN model | Accuracy(%) | *>* Five years (%) | *≤* Five years (%) |
| AlexNet | 88.00 *±* 25.30 | 70.00 *±* 48.30 | **92.50** *±* 23.72 |
| GoogleNet | 84.00 *±* 20.66 | 70.00 *±* 48.30 | 87.50 *±* 21.25 |
| SqueezeNet | 82.00 *±* 11.35 | 20.00 *±* 42.16 | **97.50** *±* 7.91 |
| ResNet50 | **94.00** *±* 9.66 | 70.00 *±* 48.30 | **100.00** *±* 0.00 |
| ResNet101 | **92.00** *±* 13.98 | 70.00 *±* 48.30 | **97.50** *±* 7.91 |
| InceptionV3 | 88.00 *±* 10.33 | 60.00 *±* 51.64 | **95.00** *±* 10.54 |
| InceptionResNetV2 | 80.00 *±* 0.00 | 0.00 *±* 0.00 | **100.00** *±* 0.00 |
| VGG16 | **94.00** *±* 9.66 | 80.00 *±* 42.16 | **97.50** *±* 7.91 |
| DenseNet201 | **96.00** *±* 8.43 | **90.00** *±* 31.62 | **97.50** *±* 7.91 |
| NasNetLarge | **92.00** *±* 10.33 | 60.00 *±* 51.64 | **100.00** *±* 0.00 |

Table 4: Prediction of DNp73 expression in biopsies taken before surgery from rectal cancer patients with preoperative radiotherapy .

|  |  |  |  |
| --- | --- | --- | --- |
| CNN model | Accuracy(%) | *>* Five years (%) | *≤* Five years (%) |
| AlexNet | 87.50 *±* 13.18 | 96.67 *±* 10.54 | 60.00 *±* 51.64 |
| GoogleNet | 85.00 *±* 17.48 | 96.67 *±* 10.54 | 50.00 *±* 52.70 |
| SqueezeNet | 70.00 *±* 19.72 | 90.00 *±* 22.50 | 10.00 *±* 31.62 |
| ResNet50 | 82.50 *±* 12.08 | 96.67 *±* 10.54 | 40.00 *±* 51.64 |
| ResNet101 | **92.50** *±* 12.08 | **100.00** *±* 0.00 | 70.00 *±* 48.30 |
| InceptionV3 | 85.00 *±* 12.91 | **100.00** *±* 0.00 | 40.00 *±* 51.64 |
| InceptionResNetV2 | 72.50 *±* 7.91 | 96.67 *±* 10.54 | 0.00 *±* 0.00 |
| VGG16 | 62.50 *±* 41.25 | 66.67 *±* 47.14 | 50.00 *±* 52.70 |
| DenseNet201 | **92.50** *±* 16.87 | 96.67 *±* 10.54 | **80.00** *±* 42.16 |
| NasNetLarge | 85.00 *±* 12.91 | **100.00** *±* 0.00 | 40.00 *±* 51.64 |

Table 5: Prognosis of DNp73 expression in surgically resected tumors from rectal cancer patients without preoperative radiotherapy.

|  |  |  |  |
| --- | --- | --- | --- |
| CNN model | Accuracy(%) | *>* Five years (%) | *≤* Five years (%) |
| AlexNet | 81.43 *±* 26.98 | 82.00 *±* 30.48 | 80.00 *±* 42.17 |
| GoogleNet | 94.29 *±* 18.07 | 96.00 *±* 12.65 | **90.00** *±* 31.63 |
| SqueezeNet | 81.43 *±* 15.13 | 88.00 *±* 21.50 | 65.00 *±* 41.16 |
| ResNet50 | 94.29 *±* 12.05 | 96.00 *±* 8.43 | **90.00** *±* 21.08 |
| ResNet101 | **95.71** *±* 9.64 | 98.00 *±* 6.32 | **90.00** *±* 21.08 |
| InceptionV3 | 94.29 *±* 12.05 | **100.00** *±* 0.00 | 80.00 *±* 42.16 |
| InceptionResNetV2 | 91.42 *±* 13.80 | **100.00** *±* 0.00 | 70.00 *±* 48.30 |
| VGG16 | 71.43 *±* 25.20 | 72.00 *±* 37.95 | 70.00 *±* 42.16 |
| DenseNet201 | 94.29 *±* 13.80 | 96.00 *±* 8.43 | **90.00** *±* 31.62 |
| NasNetLarge | 90.00 *±* 21.35 | 92.00 *±* 19.32 | 85.00 *±* 33.75 |

Table 6: Prognosis of DNp73 expression in surgically resected tumors from rectal cancer patients with preoperative radiotherapy.

|  |  |  |  |
| --- | --- | --- | --- |
| CNN model | Accuracy(%) | *>* Five years (%) | *≤* Five years (%) |
| AlexNet | 83.33 *±* 23.57 | 87.50 *±* 17.68 | 75.00 *±* 42.49 |
| GoogleNet | 88.33 *±* 17.66 | 92.50 *±* 12.08 | 80.00 *±* 42.16 |
| SqueezeNet | 70.00 *±* 15.32 | 90.00 *±* 12.91 | 30.00 *±* 34.96 |
| ResNet50 | 88.33 *±* 15.81 | 92.50 *±* 16.87 | 80.00 *±* 34.96 |
| ResNet101 | 90.00 *±* 16.10 | 92.50 *±* 12.08 | 85.00 *±* 33.74 |
| InceptionV3 | **93.33** *±* 11.65 | **95.00** *±* 10.54 | 90.00 *±* 31.62 |
| InceptionResNetV2 | 86.67 *±* 21.94 | 90.00 *±* 17.48 | 80.00 *±* 34.96 |
| VGG16 | 81.67 *±* 22.84 | 87.50 *±* 31.73 | 70.00 *±* 42.16 |
| DenseNet201 | **93.33** *±* 16.10 | 92.50 *±* 16.87 | **95.00** *±* 15.81 |
| NasNetLarge | **93.33** *±* 16.10 | **95.00** *±* 15.81 | 90.00 *±* 21.08 |

Table 7: Some properties of ten pre-trained CNNs. Note: ∗NasNetLarge network does not consist of a linear sequence of modules.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CNN | Depth | Size (MB) | Parameters (millions) | Input image size |
| AlexNet | 8 | 227 | 61.0 | 227 *×* 227 |
| GoogleNet | 22 | 27 | 7.0 | 224 *×* 224 |
| SqueezeNet | 18 | 4.6 | 1.24 | 227 *×* 227 |
| ResNet50 | 50 | 96 | 25.6 | 224 *×* 224 |
| ResNet101 | 101 | 167 | 44.6 | 224 *×* 224 |
| InceptionV3 | 48 | 89 | 23.9 | 299 *×* 299 |
| InceptionResNetV2 | 164 | 209 | 55.9 | 299 *×* 299 |
| VGG16 | 16 | 515 | 138 | 224 *×* 224 |
| DenseNet201 | 201 | 77 | 20.0 | 224 *×* 224 |
| NasNetLarge ∗ 360 | | | 88.9 | 331 *×* 331 |