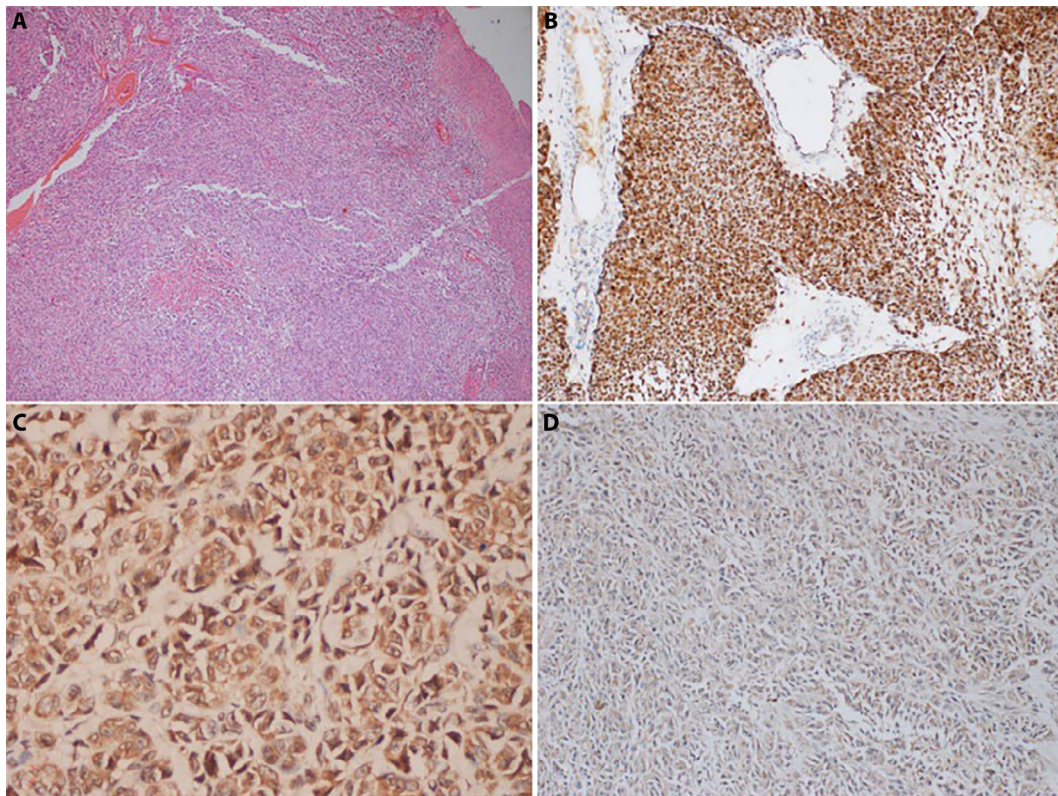
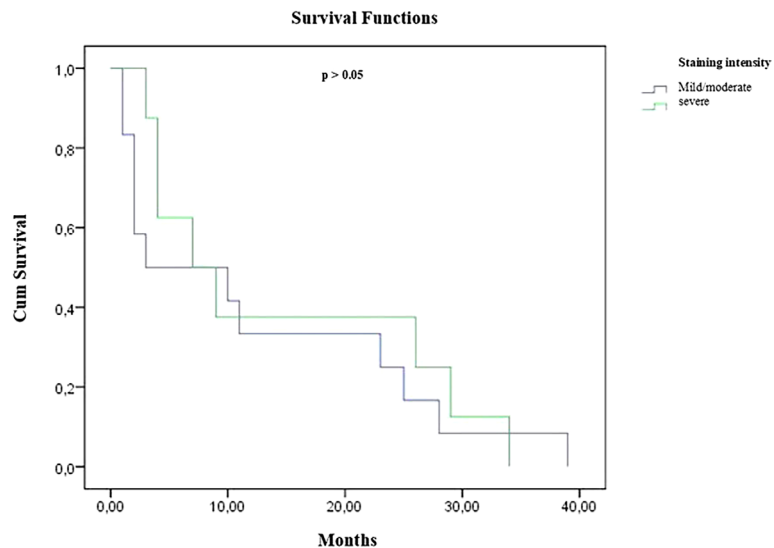


## Supplementary File



**Figure S1.** Nodular malignant melanoma. (A) Nodular malignant melanoma, H&Ex40. (B) Strong nuclear-cytoplasmic expression, GRWD1x100. (C) Moderate nuclear-cytoplasmic expression, GRWD1x200. (D) Weak nuclear-cytoplasmic expression, GRWD1x100.



**Figure S2.** Kaplan-Meier survival curves for patients stratified by GRWD1 staining intensity. Patients were divided into two groups: mild/moderate (blue line) and severe (green line) staining intensity. No statistically significant difference was observed in survival between the two groups ( $P>0.05$ ).

**Table S1. Demographic Data.**

|                                      | Min-max               | Mean $\pm$ SD   |
|--------------------------------------|-----------------------|-----------------|
| Age (year)                           | 39-100                | 68.1 $\pm$ 14.2 |
| Breslow score (mm)                   | 0.8-52                | 11.5 $\pm$ 11.4 |
| Mitotic rate (in 1 mm <sup>2</sup> ) | 2-38                  | 9.8 $\pm$ 7.7   |
| Lesion size (mm)                     | 5-64                  | 26.1 $\pm$ 16.0 |
| Survival (Months)                    | 1-39                  | 13.1 $\pm$ 12.7 |
|                                      | Subgroup              | n (%)           |
| Sex                                  | Female                | 15 (40.5)       |
|                                      | Male                  | 22 (59.5)       |
| Type                                 | Nodular               | 20 (54.1)       |
|                                      | Acral lentiginous     | 12 (32.4)       |
|                                      | Superficial spreading | 1 (2.7)         |
|                                      | Lentigo               | 1 (2.7)         |
|                                      | Metastase             | 3 (8.1)         |
| Breslow score                        | $\leq$ 4 mm           | 10 (29.7)       |
|                                      | >4 mm                 | 26 (70.3)       |
| Lesion size                          | $\leq$ 30 mm          | 21 (60)         |
|                                      | >30 mm                | 14 (40)         |
| Ulceration                           | Yes                   | 21 (56.8)       |
|                                      | No                    | 16 (43.2)       |
| Localization                         | Head-neck             | 9 (24.3)        |
|                                      | Trunk                 | 3 (8.1)         |
|                                      | Extremity             | 23 (62.2)       |
|                                      | Genital               | 2 (5.4)         |
| Metastasis                           | N/A                   | 5 (13.5)        |
|                                      | Yes                   | 23 (62.2)       |
|                                      | No                    | 9 (24.3)        |
| Staining intensity                   | Mild/ Moderate        | 22 (59.5)       |
|                                      | Severe                | 15 (40.5)       |

N/A: data not available; SD. standard deviation.

**Table S2. The Relationship between Staining Intensity and Sex, Melanoma Type, Breslow Score, Lesion Size, Ulceration, Localization, and Metastasis.**

|               |                   | Staining      |           | P values           |
|---------------|-------------------|---------------|-----------|--------------------|
|               |                   | Mild/Moderate | Severe    |                    |
| Sex           | Female            | 5 (33.3)      | 10 (66.7) | 0.020 <sup>a</sup> |
|               | Male              | 17 (77.3)     | 5 (22.7)  |                    |
| Type          | Nodular           | 14 (70)       | 6 (30)    | 0.70 <sup>b</sup>  |
|               | Acral lentiginous | 7 (58.3)      | 5 (41.7)  |                    |
| Breslow score | ≤4 mm             | 5 (50)        | 5 (50)    | 0.70 <sup>b</sup>  |
|               | >4 mm             | 16 (61.5)     | 10 (38.5) |                    |
| Lesion size   | ≤30 mm            | 13 (61.9)     | 8 (38.1)  | 0.72 <sup>a</sup>  |
|               | >30 mm            | 7 (50)        | 7 (50)    |                    |
| Ulceration    | Yes               | 15 (71.4)     | 6 (28.6)  | 0.17 <sup>a</sup>  |
|               | No                | 7 (43.7)      | 9 (56.3)  |                    |
| Localisation  | Head-neck         | 7 (77.8)      | 2 (22.2)  | 0.24 <sup>b</sup>  |
|               | Extremity         | 12 (52.2)     | 11 (47.8) |                    |
| Metastasis    | Yes               | 14 (60.9)     | 9 (39.1)  | 1.0 <sup>b</sup>   |
|               | No                | 5 (55.6)      | 4 (44.4)  |                    |

Note: Bold values are statistically significant values ( $P<0.05$ ).

<sup>a</sup>Chi-squared test.

<sup>b</sup>Fisher's Exact Test.

**Table S3. Comparison of Measurable Values by Sex, Localization, Melanoma Type, and Metastasis.**

|              |                   | Breslow score (mm)<br>Mean±SD | Mitotic rate<br>Mean±SD | Lesion size (mm)<br>Mean±SD |
|--------------|-------------------|-------------------------------|-------------------------|-----------------------------|
| Sex          | Female            | 13.4±16.5                     | 9.6±9.1                 | 28.8±19.5                   |
|              | Male              | 10.3±6.2                      | 9.9±6.8                 | 24.4±13.4                   |
|              | P*                | 0.41                          | 0.54                    | 0.66                        |
| Localisation | Head-neck         | 9.0±6.7                       | 10.5±5.6                | 23.2±10.8                   |
|              | Extremity         | 13.0±13.2                     | 8.8±8.0                 | 26.0±16.5                   |
|              | P*                | 0.62                          | 0.19                    | 0.94                        |
| Type         | Nodular           | 13.4±10.3                     | 11.5±6.9                | 27.0±14.6                   |
|              | Acral lentiginous | 6.6±4.3                       | 6.1±3.3                 | 21.9±17.3                   |
|              | P*                | 0.034                         | 0.012                   | 0.21                        |
| Metastasis   | Yes               | 14.5±13.2                     | 10.4±8.7                | 29.3±17.6                   |
|              | No                | 5.7±3.6                       | 8.2±5.2                 | 17.7±8.9                    |
|              | P*                | 0.029                         | 0.70                    | 0.09                        |

Note: Bold values are statistically significant values ( $P<0.05$ ).

\*Mann-Whitney U test.

Table S4. Correlation Analysis (Spearman) of Numeric Data.

|                    |            | Age                 | Breslow             | Mitotic rate         | Lesion size | Survival | Staining intensity |
|--------------------|------------|---------------------|---------------------|----------------------|-------------|----------|--------------------|
| Age                | Spearman r | 1                   |                     |                      |             |          |                    |
|                    | p          | .                   |                     |                      |             |          |                    |
|                    | n          | 37                  |                     |                      |             |          |                    |
| Breslow            | Spearman r | 0.387 <sup>*</sup>  | 1                   |                      |             |          |                    |
|                    | p          | <b>0.022</b>        | .                   |                      |             |          |                    |
|                    | n          | 35                  | 35                  |                      |             |          |                    |
| Mitotic rate       | Spearman r | 0.547 <sup>**</sup> | 0.330               | 1                    |             |          |                    |
|                    | p          | <b>&lt;0.001</b>    | 0.053               | .                    |             |          |                    |
|                    | n          | 37                  | 35                  | 37                   |             |          |                    |
| Lesion size        | Spearman r | 0.362 <sup>*</sup>  | 0.674 <sup>**</sup> | 0.292                | 1           |          |                    |
|                    | p          | <b>0.033</b>        | <b>&lt;0.001</b>    | 0.089                | .           |          |                    |
|                    | n          | 35                  | 34                  | 35                   | 35          |          |                    |
| Survival           | Spearman r | -0.413              | -0.206              | -0.537 <sup>*</sup>  | -0.084      | 1        |                    |
|                    | p          | 0.071               | 0.412               | <b>0.015</b>         | 0.732       | .        |                    |
|                    | n          | 20                  | 18                  | 20                   | 19          | 20       |                    |
| Staining intensity | Spearman r | -0.289              | 0.006               | -0.535 <sup>**</sup> | 0.103       | 0.240    | 1                  |
|                    | p          | 0.083               | 0.974               | <b>0.001</b>         | 0.556       | 0.309    | .                  |
|                    | n          | 37                  | 35                  | 37                   | 35          | 20       | 37                 |

Note: Bold values are statistically significant values ( $P < 0.05$ ).

\* $P < 0.05$ ; \*\* $P < 0.01$ .

**Table S5. Patient Demographic and Clinical Data.**

| Patient numbers | Age | Sex | Melanoma type | Metastasis | Localisation | GRWD1 staining intensity |
|-----------------|-----|-----|---------------|------------|--------------|--------------------------|
| 1               | 56  | M   | AL            | Yes        | Extremity    | 3                        |
| 2               | 55  | F   | AL            | Yes        | Extremity    | 3                        |
| 3               | 78  | M   | Nodular       | Yes        | Head-neck    | 2                        |
| 4               | 82  | M   | Nodular       | N/A        | Extremity    | 2                        |
| 5               | 70  | M   | AL            | Yes        | Extremity    | 2                        |
| 6               | 60  | M   | Nodular       | Yes        | Extremity    | 3                        |
| 7               | 77  | M   | Nodular       | No         | Head-neck    | 3                        |
| 8               | 39  | F   | AL            | No         | Extremity    | 3                        |
| 9               | 80  | M   | Nodular       | Yes        | Head-neck    | 1                        |
| 10              | 63  | M   | AL            | Yes        | Extremity    | 3                        |
| 11              | 58  | M   | Nodular       | Yes        | Extremity    | 1                        |
| 12              | 89  | M   | Nodular       | Yes        | Trunk        | 2                        |
| 13              | 46  | F   | Nodular       | No         | Head-neck    | 2                        |
| 14              | 86  | M   | Nodular       | Yes        | Genital      | 2                        |
| 15              | 69  | M   | Nodular       | Yes        | Trunk        | 2                        |
| 16              | 84  | M   | AL            | Yes        | Extremity    | 2                        |
| 17              | 83  | M   | AL            | Yes        | Extremity    | 2                        |
| 18              | 77  | F   | Nodular       | Yes        | Extremity    | 3                        |
| 19              | 55  | F   | AL            | Yes        | Extremity    | 2                        |
| 20              | 58  | F   | SS            | N/A        | Extremity    | 3                        |
| 21              | 48  | M   | Nodular       | N/A        | Extremity    | 2                        |
| 22              | 80  | M   | Nodular       | Yes        | Extremity    | 3                        |
| 23              | 50  | F   | AL            | No         | Extremity    | 3                        |
| 24              | 57  | M   | AL            | No         | Extremity    | 2                        |
| 25              | 62  | F   | Nodular       | No         | Trunk        | 3                        |
| 26              | 80  | M   | Nodular       | Yes        | Extremity    | 2                        |
| 27              | 73  | F   | Metastasis    | Yes        | Extremity    | 3                        |
| 28              | 62  | M   | Metastasis    | Yes        | Head-neck    | 1                        |
| 29              | 79  | F   | Nodular       | N/A        | Head-neck    | 2                        |
| 30              | 72  | M   | Nodular       | No         | Extremity    | 2                        |
| 31              | 74  | F   | Nodular       | Yes        | Genital      | 3                        |
| 32              | 61  | M   | Nodular       | No         | Head-neck    | 2                        |
| 33              | 85  | M   | AL            | No         | Extremity    | 2                        |
| 34              | 48  | F   | AL            | Yes        | Extremity    | 2                        |
| 35              | 72  | F   | LMM           | N/A        | Head-neck    | 3                        |
| 36              | 54  | F   | Metastasis    | Yes        | Extremity    | 3                        |
| 37              | 100 | F   | Nodular       | Yes        | Head-neck    | 2                        |

Abbreviations: M, male; F, female; AL, Acral lentiginous; SS, superficial spreading; LMM, lentigo malignant melanoma; N/A, not applicable; GRWD1, glutamate-rich WD40 repeat-containing 1; GRWD1 staining intensity (1: mild, 2: moderate, 3: severe).