Breast Cancer Res Treat (2012) 133:401–404
DOI 10.1007/s10549-012-2007-7

ERRATUM

Erratum to: Pathways mediating the effects of cannabidiol on the reduction of breast cancer cell proliferation, invasion, and metastasis

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Published online: 22 March 2012
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Erratum to: Breast Cancer Res Treat (2011) 129:37–47 DOI 10.1007/s10549-010-1177-4

The original publication of the article includes figures of lower resolution. The author would like to correct this with the publication of higher resolution figures that are reproduced below.

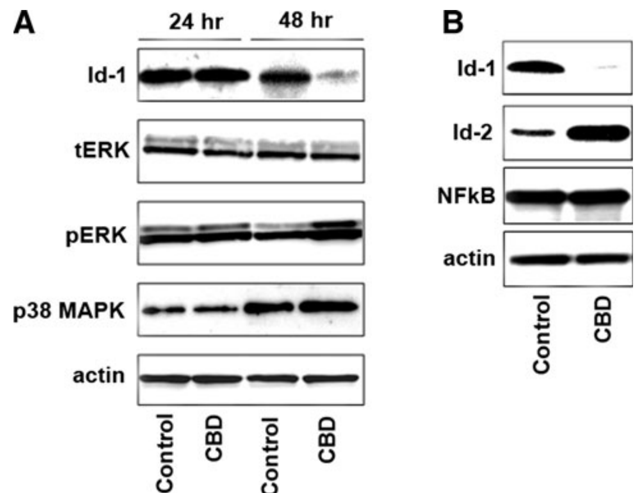

Fig. 1 CBD up-regulates ERK phosphorylation and Id-2 expression. (**A**) Proteins from MDA-MB231 cells treated with 1.5 µM CBD (as previously described [21]) for 1 or 2 days were extracted and analyzed for Id-1, total ERK, pERK, or p38 by Western blot analysis. (**B**) Proteins from MDA-MB231 cells treated with CBD for 3 days were extracted and analyzed for Id-1, Id-2, or NFkappaB by Western blot analysis

The online version of the original article can be found under doi:10.1007/s10549-010-1177-4.

Electronic supplementary material The online version of this article (doi:10.1007/s10549-012-2007-7) contains supplementary material, which is available to authorized users.

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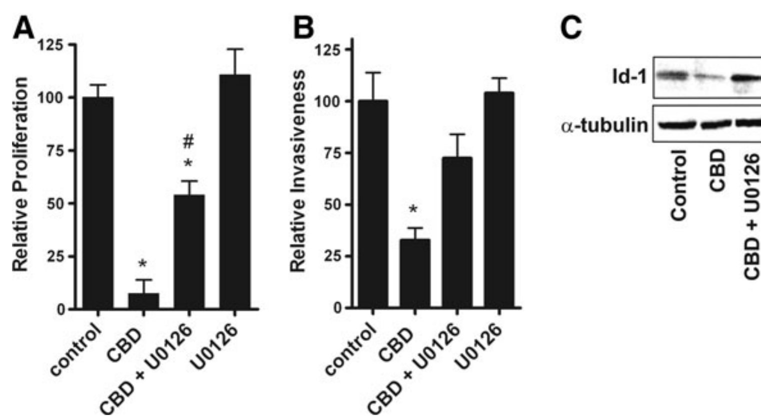

Fig. 2 ERK partly mediates the inhibitory activity of CBD on cell growth and invasion. MDA-MB231 cells were treated for 3 days with vehicle (Control) or 1.5 μM CBD in the presence and absence of 0.1–0.5 μM U0126. Cell proliferation (**A**) and invasion (**B**) were measured using the MTT and Boyden chamber assays, respectively. Data are presented as relative proliferation or invasiveness of the cells, where the respective controls are set as 100%. (**C**) Proteins from MDA-MB231 cells treated with vehicle (control) or 1.5 μM of CBD for 3 days in the absence or presence of U0126 were extracted and analyzed for Id-1 by Western blot analysis. (*) indicates statistically significant difference from control ($P < 0.05$). (#) indicates statistically significant difference from CBD ($P < 0.05$)

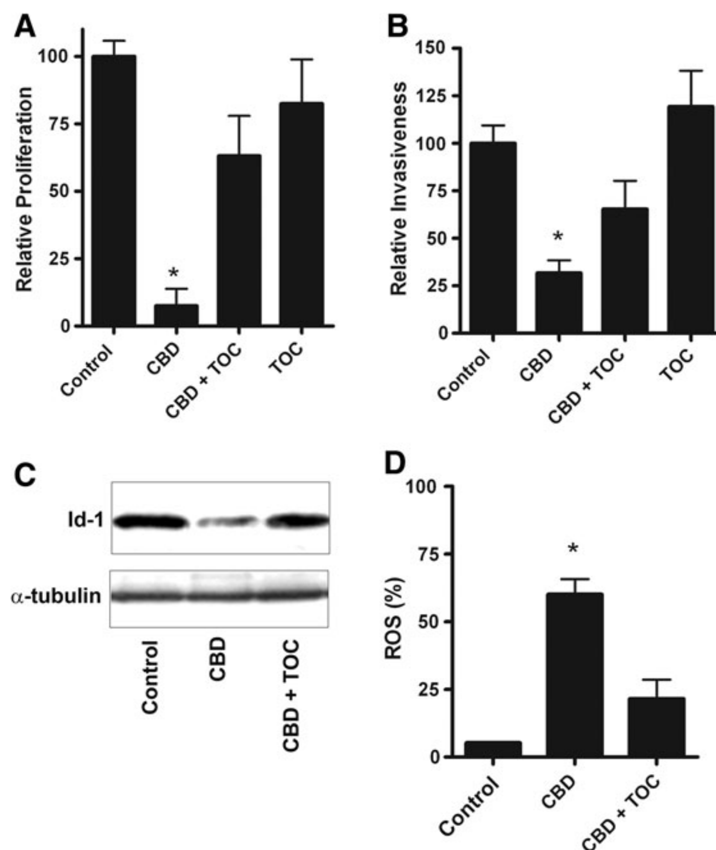

Fig. 3 Production of ROS represents another factor involved in the inhibitory activity of CBD. MDA-MB231 cells were treated for 3 days with vehicle (Control) or 1.5 μM CBD in the presence and absence of 20 μM TOC. Cell proliferation (**A**) and invasion (**B**) were measured using the MTT and Boyden chamber assay, respectively. (**C**) Proteins from cells treated with vehicle (control) or 1.5 μM of CBD for 3 days in the absence or presence of TOC were extracted and analyzed for Id-1 by Western blot analysis. (**D**) The production of ROS was measured using 2′-7′ Dichloro-dihydrofluorescein (Sigma-Aldrich). (*) indicates statistically significant differences from control ($P < 0.05$)

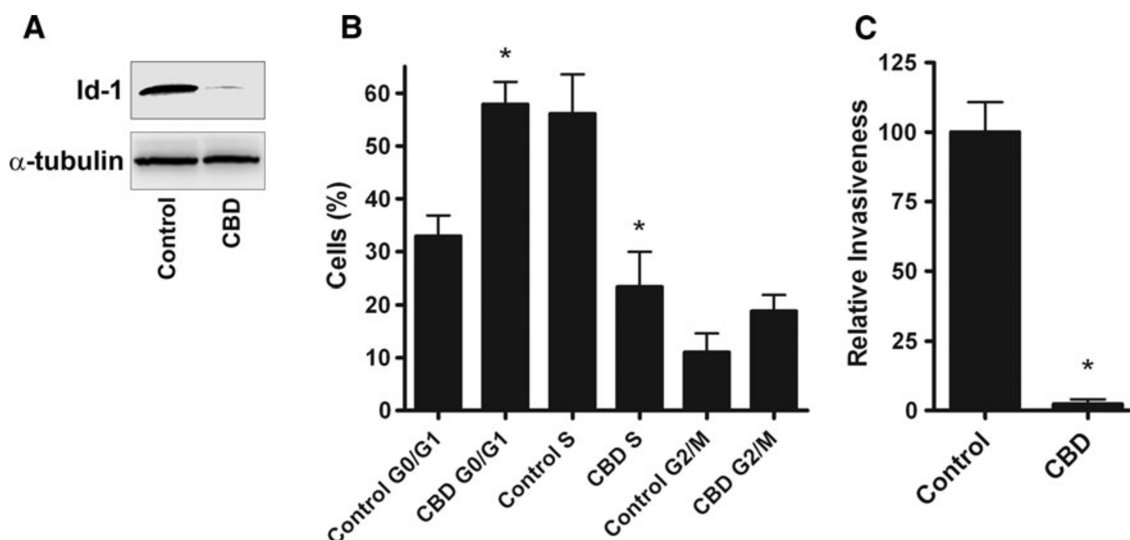

Fig. 4 CBD inhibits the expression of Id-1 and corresponding breast cancer proliferation and invasion in mouse 4T1 cells. (**A**) 4T1 cells were treated for 3 days with 1.5 μM CBD, proteins were extracted and analyzed for Id-1 expression. (**B**) 4T1 cells were collected and cell cycle analyzed using a desktop FACS Calibur with Cell Quest Pro software (BD Bioscience, CA). The distribution of cells in different cell cycle stages was determined according to their DNA content. (**C**) Invasion assays were carried out using the Boyden chamber assay. (*) indicates statistically significant differences from control ($P < 0.05$)

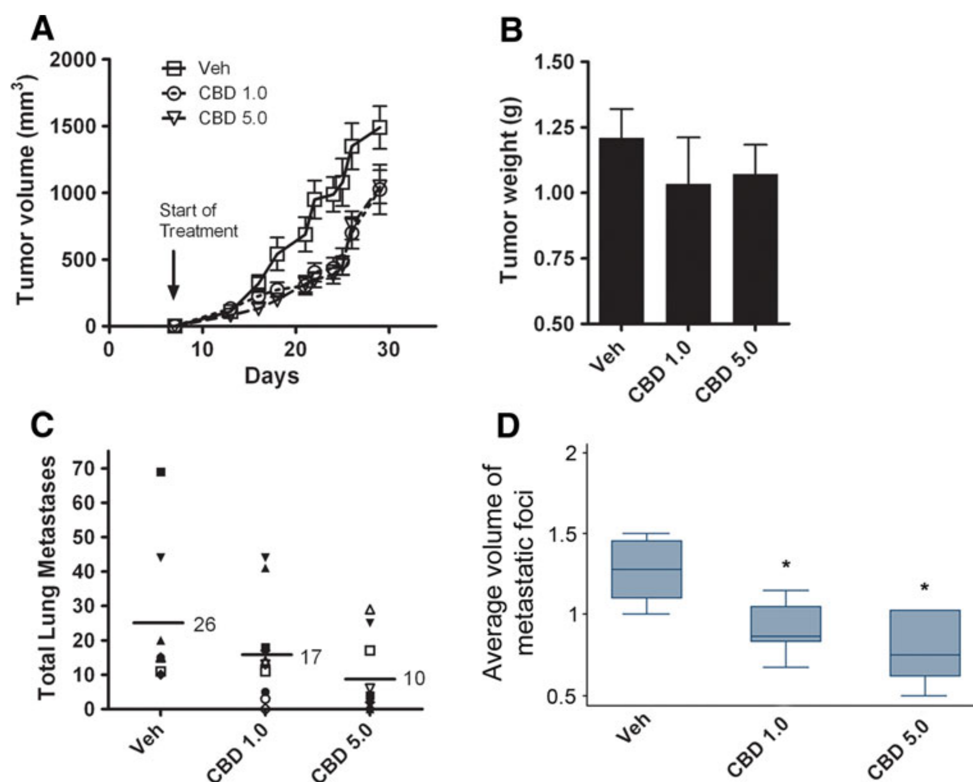

Fig. 5 CBD reduces primary tumor growth and metastasis of 4T1 cancer cells in an orthotopic mouse model. Primary tumors and subsequent secondary tumors (metastases) were generated in BALB/c mice by subcutaneous injection of 1×10^5 4T1 cells under the fourth major nipple. Treatment with CBD was initiated upon detection of the first palpable tumor (approximately 7 days). (**A**) The primary tumor volume was calculated by measuring the perpendicular largest diameters of the tumor with a caliper. (**B**) The weight of the tumors was also measured. (**C**) The visible lung metastases were measured using a dissecting microscope. (**D**) The average volume per metastatic foci was calculated as described in the methods. (*) indicates statistically significant differences from vehicle ($P < 0.05$)

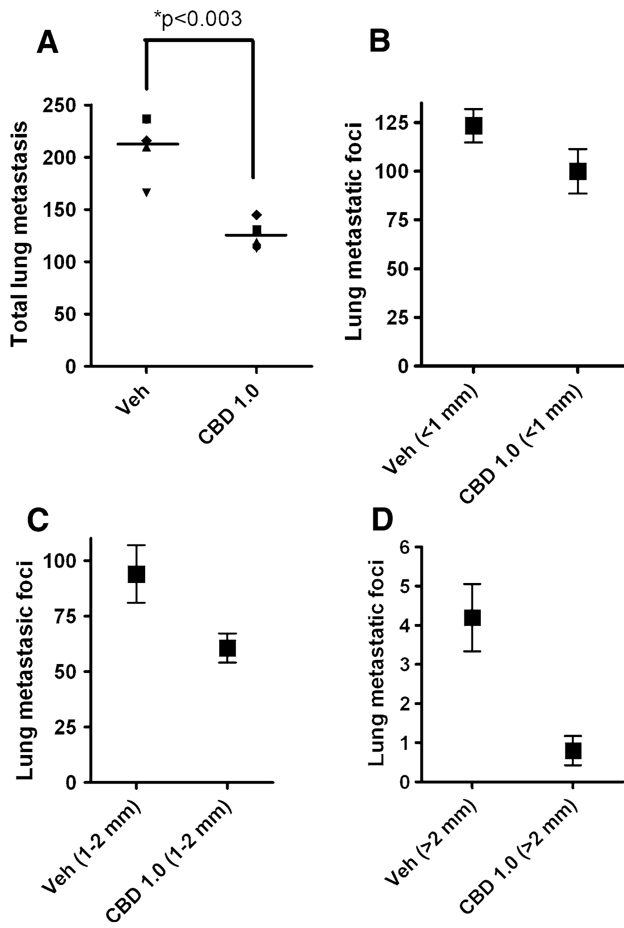

Fig. 6 CBD reduces the number of metastatic foci in the syngeneic model of tail vein injection. Lung metastases were generated in BALB/c mice after tail vein injection of 5×10^5 4T1 cells. One day after the injection, the tumor-bearing mice were injected i.p. once a day with vehicle or 1 mg/kg CBD for 15 days. Visible lung metastases were counted and measured by using a dissecting microscope (**A**). Lung metastases measured included those (**B**) <1 mm, (**C**) 1–2 mm, and (**D**) >2 mm