

Background & Significance

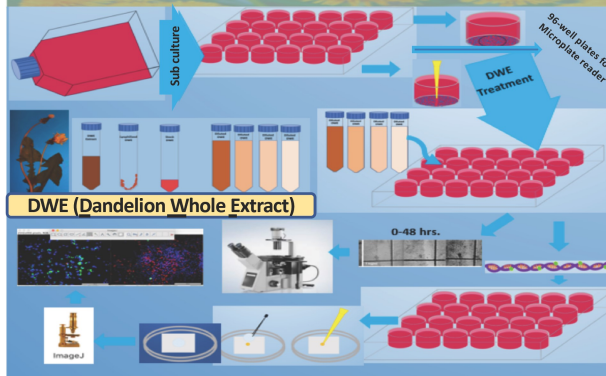
- 1,806,590 new cancer cases and 606,520 cancer deaths were expected to occur in 2020 in the United States.
- Patients with cancer backgrounds are more susceptible to viral infections, particularly to COVID-19.
- Over 60% of the FDA approved drugs are either NP (Natural Product), derived from NP or mimic NP.
- The biological environment adapts to NP presence allowing it to work efficiently.
- Crude NP extracts are rich sources of chemically diverse and biologically relevant compounds.
- Dandelion grows throughout the world and is consumed safely as part of Middle Eastern and ancient Chinese medicine.
- Dandelion has anti-inflammatory and anti-carcinogenic properties.

Observation & Research Question

There are several reports in Iraqi Kurdistan's local journals about cancer patients claiming cure following consuming dandelion⁴.

Are there scientific evidences to support these claims?

Materials and methods



Acknowledgements

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References

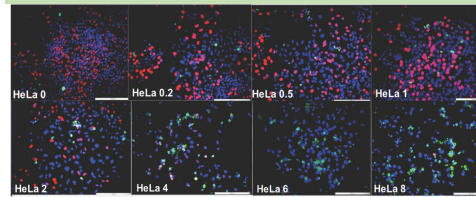
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Results

Data exhibit a significant inhibition of proliferation and migration versus induction of apoptosis in HeLa cells. This anti-cancer effect is supported by data demonstrating no significant effect on normal human cell lines, HCEC & HDF's proliferation, migration and apoptosis at DWE concentration of 4 mg/mL and lower.

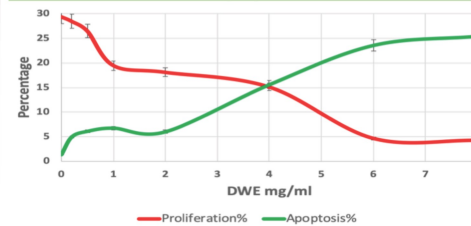
Proliferation & Viability Assays

DWE Treated HeLa Cell Proliferation Assay



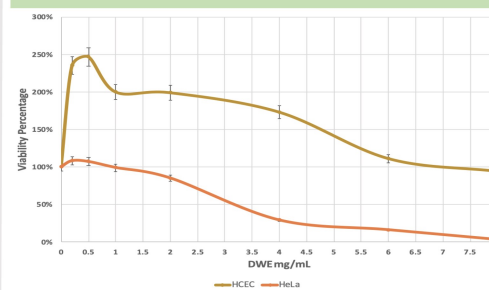
Click EdU assay of HeLa cells treated with DWE concentrations of 0-8 mg/mL. **EdU** denotes proliferation. **Caspase 3** signifies cell death. **DAPI** is a counterstain to label all cells.

DWE Treated HeLa Proliferation vs. Apoptosis



Apoptosis (green line) was positively correlated with increasing doses, while proliferation (red line) was negatively correlated.

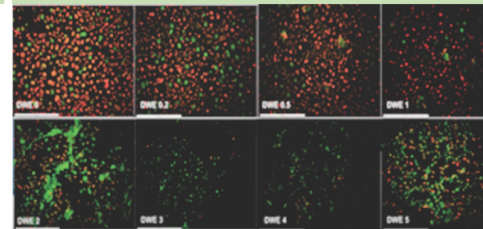
DWE Treated HCEC vs. HeLa cell Viability



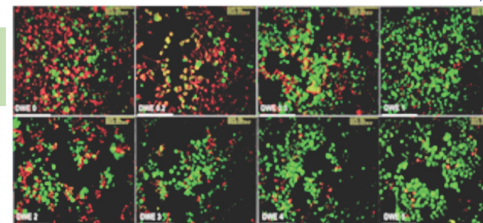
DWE inhibited HeLa Cell Viability yet Increased HCEC Cell Viability.

Programmed Cell Death Assays

HeLa Versus HCEC Mitochondrial Damage

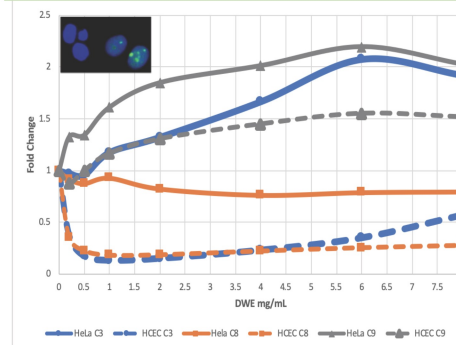


Top rows: DWE 0,0.2,0.5, 1 mg/mL
Down rows: DWE 2, 4, 6, 8 mg/mL



DWE extracts affects HeLa cells mitochondria earlier and to a greater degree as compared to HCEC cells.

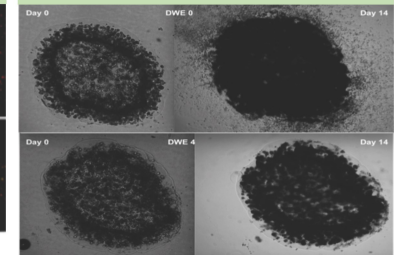
Caspase 3, 8, and 9 Activation in DWE Treated HeLa & HCEC



Caspases are differentially activated in HeLa and HCEC.

Invasion Assay

Invasion Inhibition of DWE Treated HeLa Cells

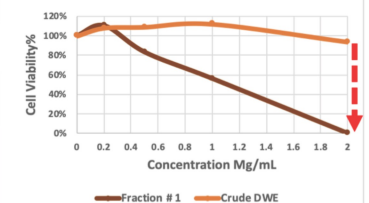


Invasion of HeLa cells artificial tumors nested in the collagen lattice and treated with DWE 0 and 4 mg/mL. DWE inhibited HeLa cells invasion.

Future Directions

To determine bioactive anti-cancer fractions and pure compounds of dandelion.

24 Hrs. Treated HeLa Cells with Fraction#1 vs. Crude Extract



While the Crude extract at concentration of 2 mg/mL reduced HeLa cell viability by less than 10% in 24 hours, fraction#1 decreased HeLa cell viability by 100% at the same dose and time point.

Social Impact & Conclusion

Dandelion contains some unknown components that particularly activate intrinsic pathway of programmed cell death in cancer cells.

Taking an everyday weed growing in everyone's backyard and turning it into the next cancer treatment is exciting and novel.