



# multiple myeloma cancer coaching

## integrative therapies guide



**DAVID EMERSON**  
Director PeopleBeatingCancer  
Multiple Myeloma Survivor  
MM Cancer Coach

### introduction

According to the American Cancer Society the median survival of newly diagnosed multiple myeloma patients is 29-62 months depending on stage at diagnosis. Conventional oncology cannot cure multiple myeloma. Therefore it is incumbent on MM patients to look beyond conventional chemotherapy for deeper, longer remissions with the least collateral damage possible.

Evidence-based integrative therapies may help you beat the odds.

### Chemotherapy Drug: CYTOXAN (CYCLOPHOSPHOMIDE)

**SIDE EFFECTS:** Chemotherapy-induced nausea and vomiting, bone marrow suppression, stomach ache, hemorrhagic cystitis, diarrhea, darkening of the skin/nails..

### Integrative Therapies

#### Omega 3 Fatty Acids (fish oil)

Omega-3 fatty acids are able to modulate the painful symptoms associated to cyclophosphamide-induced-hemorrhagic cystitis in mice.

“Our study suggests that EPA and DHA induce selective cytotoxic effects in MM and increase sensitivity to bortezomib and calls for further exploration into a potential application of these n-3 polyunsaturated fatty acids in the therapy of MM. [\(READ MORE<sup>1</sup>\)](#)”

#### Resveritrol

Prevention of cyclophosphamide-induced hemorrhagic cystitis by resveratrol: a comparative experimental study with mesna

“In conclusion, marked bladder protection was found in 20 and 40 mg/kg RES applications compared to the control group, but this protection was weaker than with mesna. [\(READ MORE<sup>2</sup>\)](#)”

#### Green Tea Extract

Pharmacodynamic Interaction of Green Tea Extract with Hydrochlorothiazide against Cyclophosphamide-Induced Myocardial Damage

“The present findings clearly suggested that green tea extract dose dependently reduces cyclophosphamide-induced myocardial toxicity. Green tea when combined with hydrochlorothiazide can reduce the associated side effects and exhibits myocardial protection. [\(READ MORE<sup>3</sup>\)](#)”

## Chemotherapy Drug: REVLIMID (LENALIDOMID)

**SIDE EFFECTS:** Thrombosis, pulmonary embolus, and hepatotoxicity, as well as bone marrow toxicity resulting in neutropenia...

### Integrative Therapies

#### Curcumin

Curcumin enhances the cytotoxic and chemo-sensitising effects of lenalidomide in human multiple myeloma cells  
“Curcumin exerts a cytotoxic effect additive to that of lenalidomide on H929 myeloma cells, and it also enhances the chemo-sensitizing effects of this agent. (READ MORE<sup>4</sup>)”

## Chemotherapy Drug: VELCADE (BORTEZOMIB)

**SIDE EFFECTS:** Peripheral neuropathy in 40% of patients; occasionally, it can be painful. This can be worse in patients with pre-existing...

### Integrative Therapies

#### Curcumin

Sensitizing human multiple myeloma cells to the proteasome inhibitor bortezomib by novel curcumin analogs  
“Here we show that the water-soluble analog of curcumin #12, but not curcumin, in combination with bortezomib could enhance the proteasome-inhibitory effect in multiple myeloma cells. (READ MORE<sup>5</sup>)”

#### Omega 3 Fatty Acids (fish oil)

Omega-3 fatty acids, EPA and DHA induce apoptosis and enhance drug sensitivity in multiple myeloma cells but not in normal peripheral mononuclear cells.

“Our study suggests that EPA and DHA induce selective cytotoxic effects in MM and increase sensitivity to bortezomib and calls for further exploration into a potential application of these n-3 polyunsaturated fatty acids in the therapy of MM. (READ MORE<sup>6</sup>)”

#### CBD Oil

The effects of cannabidiol and its synergism with bortezomib in multiple myeloma cell lines. A role for transient receptor potential vanilloid type-2

“These results showed that CBD by itself or in synergy with BORT strongly inhibited growth, arrested cell cycle progression and induced MM cells death by regulating the ERK, AKT and NF- $\kappa$ B pathways with major effects in TRPV2+ cells. (READ MORE<sup>7</sup>)”

#### Honokiol

Honokiol overcomes conventional drug resistance in human multiple myeloma by induction of caspase-dependent and -independent apoptosis.

“Furthermore, HNK enhances MM cell cytotoxicity and apoptosis induced by bortezomib... (READ MORE<sup>8</sup>)”

#### Thymoquinone

Thymoquinone overcomes chemoresistance and enhances the anticancer effects of bortezomib through abrogation of NF- $\kappa$ B regulated gene products in multiple myeloma xenograft mouse model.

“Overall, our results demonstrate that TQ can enhance the anticancer activity of bortezomib in vitro and in vivo and may have a substantial potential in the treatment of MM. (READ MORE<sup>9</sup>)”

## Chemotherapy Drug: MELPHALAN

**SIDE EFFECTS:** Nausea and vomiting, and oral ulceration, Bone marrow suppression, including decreased white blood cell count causing increased risk of...

### Integrative Therapies

#### Curcumin

Reversal of multidrug resistance by curcumin through FA/BRCA pathway in multiple myeloma cell line MOLP-2/R

“The results indicated that combination of melphalan with curcumin had stronger effects on the proliferation inhibition, inducement of apoptosis, G2/M phase ar-rest, and enhancement of intracellular drug concentration than melphalan alone in MOLP-2/R cells... (READ MORE<sup>10</sup>)”

## Chemotherapy Drug: DEXAMETHASONE

**SIDE EFFECTS:** Aggression, agitation, anxiety, dizziness, fast, slow, pounding, or irregular heartbeat or pulse, headache, irritability, mental depression, numbness or tingling in the arms or leg...

### Integrative Therapies

#### Curcumin

Short-Term Curcumin Gavage Sensitizes Insulin Signaling in Dexamethasone-Treated C57BL/6 Mice (READ MORE<sup>11</sup>)

#### Resveritrol

Resveratrol prevents dexamethasone-induced expression of the muscle atrophy-related ubiquitin ligases atrogin-1 and MuRF1 in cultured myotubes through a SIRT1-dependent mechanism.

“These observations suggest that the early beneficial effect of curcumin intervention in dexamethasone-treated mice is the sensitization of insulin signaling, involving the stimulation of FGF21 production, a known insulin sensitizer. (READ MORE<sup>12</sup>)”

#### Omega 3 Fatty Acids (fish oil)

The effects of omega-3 fatty acid supplementation on dexamethasone-induced muscle atrophy

“Dexamethasone injection impaired insulin tolerance ( $P < 0.05$ ) and elevated ambient plasma insulin concentrations by  $\sim 2.7$ -fold ( $P < 0.01$ ). Concomitant cur-cumin administration improved insulin sensitivity and reduced hepatic gluconeogenic gene expression. (READ MORE<sup>13</sup>)”

## FOOTNOTES

1. <https://www.ncbi.nlm.nih.gov/pubmed/26482705>
2. <http://link.springer.com/article/10.1007/s11255-014-0833-8>
3. <https://www.ncbi.nlm.nih.gov/pubmed/25253931>
4. <http://www.sciedu.ca/journal/index.php/jhm/article/view/2562>
5. <https://www.ncbi.nlm.nih.gov/pubmed/22012631>
6. <https://www.ncbi.nlm.nih.gov/pubmed/25277647>
7. <https://www.ncbi.nlm.nih.gov/pubmed/24293211>
8. <https://www.ncbi.nlm.nih.gov/pubmed/15870175>
9. <https://www.ncbi.nlm.nih.gov/pubmed/24504138>
10. [https://www.ncbi.nlm.nih.gov/pubmed/19756599?ordinalpos=1&itool=Email.EmailReport.Pubmed\\_ReportSelector:Pubmed\\_RVDocSum](https://www.ncbi.nlm.nih.gov/pubmed/19756599?ordinalpos=1&itool=Email.EmailReport.Pubmed_ReportSelector:Pubmed_RVDocSum)
11. <https://www.ncbi.nlm.nih.gov/pubmed/26338887>
12. <https://www.ncbi.nlm.nih.gov/pubmed/22166204>
13. <https://www.hindawi.com/journals/bmri/2014/961438/>