

**Novel Composition for the treatment of Multiple Myeloma (Tel Hashomer)**  
**code: THM 2013023**

## Novel Composition for the treatment of Multiple Myeloma

Dr Merav Laibo , Sheba Medical Center

<b>Categories</b>	Novel Drug , Multiple Sclerosis
<b>Development Stage</b>	Preclinical
<b>Patent Status</b>	Three related patent applications(2011, 2013, 2014)

### Background and Technology

**Multiple myeloma (MM)**, also known as **plasma cell myeloma, myelomatosis, or Kahler's disease**, is a cancer of [plasma cells](#), a type of [white blood cell](#) normally responsible for producing antibodies. In multiple myeloma, collections of abnormal plasma cells accumulate in the [bone marrow](#), where they interfere with the production of normal blood cells. Most cases of multiple myeloma also feature the production of a paraprotein an abnormal antibody which can cause kidney problems. Bone lesions and hypercalcemia (high blood calcium levels) are also often encountered.

Multiple myeloma is diagnosed with [blood tests](#) (serum [protein electrophoresis](#), serum free kappa/lambda light chain assay), [bone marrow examination](#), urine protein electrophoresis, and X-rays of commonly involved bones.

Multiple myeloma is considered to be incurable but treatable. Remissions may be induced with steroids, chemotherapy, [proteasome inhibitors](#), immuno-modulatory drugs such as thalidomide or lenalidomide, and [stem cell transplants](#). [Radiation therapy](#) is sometimes used to reduce pain from bone lesions.

We have unfolded the cellular mechanism by which plasma cells became tumorigenic , and have identified a small lead molecule for the development of new drug to treat MM.

**Number of New Cases and Deaths per 100,000:** The number of new cases of myeloma was 6.1 per 100,000 men and women per year. The number of deaths was 3.4 per 100,000 men and women per year. These rates are age-adjusted and based on 2007-2011 cases and deaths.

**Lifetime Risk of Developing Cancer:** Approximately 0.7 percent of men and women will be diagnosed with myeloma at some point during their lifetime, based on 2009-2011 data.

**Prevalence of this cancer:** In 2011, there were an estimated 83,367 people living with myeloma in the United States.

Multiple myeloma is the second most prevalent blood cancer (10%) after [non-Hodgkin's lymphoma](#). It represents approximately 1% of all cancers and 2% of all cancer deaths. Although the peak age of onset of multiple myeloma is 65 to 70 years of age, recent statistics

## Development Stage:

We have studied our composition with respect to mechanism of action and demonstrated efficacy in animal tumor bearing model with new modality of action:

The molecule reduces viability and significantly decreased survival of several human MM cells of MM cells regardless of sensitivity to conventional chemotherapy:

R1

The molecule induces apoptosis and inhibits proliferation of MM cell in a time- and concentration-dependent manner.

Extensive analysis of the novel compound on cell signalling, have been revealed, and was shown to affect directly Tubulin.

Our compound enhances cytotoxicity of conventional and novel anti-MM therapies.

***In vivo*** anti-MM efficacy of the novel composition was evaluated in a xenograft murine model. Over 80% reduction of the tumor volume was observed with dose response effect.

## The Need

Till date there is no cure for MM and the survival rate is about 46%. Initial treatment of multiple myeloma depends on the patient's age and comorbidities. In recent years, high-dose chemotherapy with [autologous hematopoietic stem-cell transplantation](#) has become the preferred treatment for patients under the age of 65. Treatment for multiple myeloma is focused on therapies that decrease the clonal plasma cell population and consequently decrease the signs and symptoms of disease. Treatment with bisphosphonates (e.g. pamidronate or [zoledronic acid](#)) are routinely administered to prevent fractures; they have also been observed to have direct anti-tumor effect even in patients without known skeletal disease.

## Advantages

Our research results opens the opportunity to develop a novel drug that corresponds to the direct target in the plasma tumor cells. It is a kinase inhibitor and orally-bioavailable. We believe that this might lead to less side effects and decrease mortality rate.

## The Market

In 2012-2013 two important new products reach the market, Onyx's Kyprolis and

Celgene's Actimid. Both of these have advantages over current drugs, but they're basically incremental improvements on what we already have - proteasome inhibitors and immuno-modulators. The market can be categorized on the basis of products by major manufacturers such as Thalomid by Celgene Corporation, Doxil by Johnson and Johnson, Revlimid by Celgene Corporation, and Velcade by Johnson & Johnson. The market is segmented on the basis of geography into the North American, Asia-Pacific, European and Rest of the World (RoW) regions

The market for multiple myeloma therapeutics is expected to grow with rising incidences of the disease amongst population. The American Cancer Society (ACS) has estimated that by the end of 2014, nearly 24,050 new cases of multiple myeloma will be diagnosed in the U.S.

The Multiple Myeloma Drug Market will experience robust 5.6 % annual growth from 2010 to 2020,sales will reach \$9.9bn in 2017.

#### **Future outlook**

Currently we are expending the in - vivo efficacy models and evaluate the therapeutic window and safety issues.

The Multiple Myeloma Drug Market Will Experience Robust 5.6 Percent Annual Growth from 2010 to 2020,sales will reach \$9.9bn in 2015.

Tel Hashomer Medical Research, Infrastructure and Services

Tel: +972-3-5305998 Fax: +972-3-5305944 sylvie.luria@sheba.health.gov.il