



## Novel enzyme inhibitors for the treatment of aggressive forms of breast cancer

### Problem to be solved

Breast cancer is the most common cancer in women. Some forms are very aggressive due to their invasive growth and the high frequency of metastases. Treatment is extremely difficult and costly, especially when highly specific antibodies are applied. Even these do not work in every case. Enzyme inhibitors developed so far only inhibit one enzyme responsible for tumor growth - HER2. The effectiveness of these inhibitors is limited since resistance has developed due to mutations in HER2. In addition to HER2 the enzyme Brk plays an important role in the development of aggressive forms of breast cancer. The enzyme is overexpressed in cells of those tumors, leading to enhanced HER2 activity, resulting in uncontrolled tumor growth as well as the inhibiting apoptosis of tumor cells. Enzyme inhibitors which inhibit more than one enzyme could help to overcome this problem but are currently not available.

### Novel substances

This invention presents novel substances which act as dual enzyme inhibitors. The novel inhibitors selectively inhibit HER2 and/or Brk in a nano- to picomolar range. The growth of breast cancer cells is inhibited *in vitro* at nanomolar concentrations without showing critical toxic effects. Apoptosis of tumor cells is promoted and metastasis is inhibited due to the inhibition of Brk. At the same time the activity of HER2 is inhibited. Brk/HER2 inhibitors do not act at the ligand binding site of HER2 but at a binding site in the cytosol which makes the treatment of even antibody therapy-resistant tumors possible. Therefore three important processes are addressed concurrently: the receptor mediated tumor growth, the inhibition of apoptosis, and metastasis. Resistance can be overcome and tumors can be treated more effectively. A less cost intensive therapy can be developed. A method for producing the novel substances is also provided.

### Applications

We are seeking partners to develop the provided substances further for an application in tumor therapy.

### Patent situation

An international patent application has been filed.