



Bundesministerium
für Bildung
und Forschung



wir! Wandel durch
Innovation
in der Region

MarPiM - Marine Pilzbiotechnologie zur Frühzeitigen Bekämpfung metastasierender Melanome

(start date 1.8.2023)

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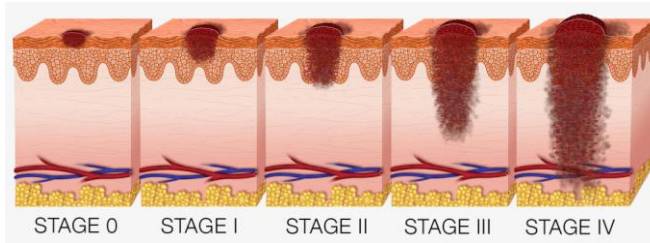
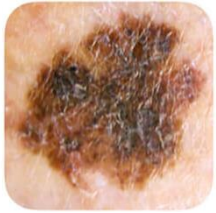
GEOMAR Helmholtz Centre for Ocean Research Kiel



Malignant Melanoma

Skin cancer: Among the most common cancers in Germany

Malignant melanoma (MM): Most aggressive form, responsible for 90% of all skin cancer deaths



20% of patients will progress to metastases

Lymph nodes,
liver, brain,
lungs, bones,...

5-yr survival rate - 14%



Problems: Tumor cell dissemination at early stages / increased risk of metastasis
Poor response to conventional chemotherapy
Severe side effects, drug resistance

Need for prophylaxis of metastatic disease

High risk patients with ulcerated skin lesions > 4mm thick, lymph node involvement

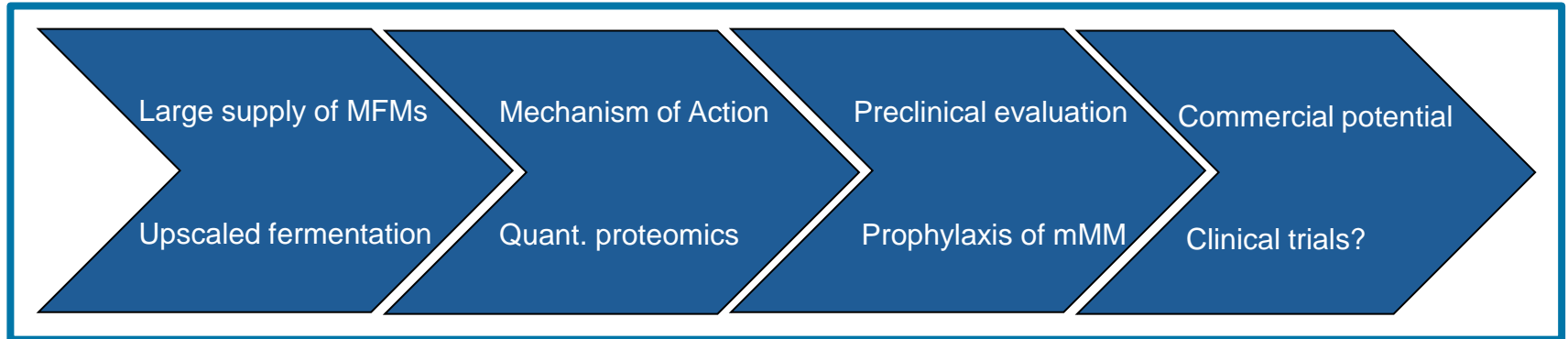
-> Long term administration of a safe drug to prevent metastasis development

MarPiM: Proof of Concept & Goals



Novel, chemically fully characterized Marine Fungal Metabolites (**MFMs**) discovered from seaweed endophytic fungus w/ strong *in vitro* activity against melanoma cells

Aim: Investigate the potential of **MFMs** for *prophylaxis* of metastatic Malignant Melanoma (**mMM**)



Symbiotic (Endophytic) Fungi & Cancer

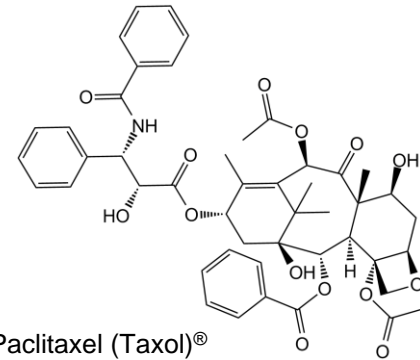
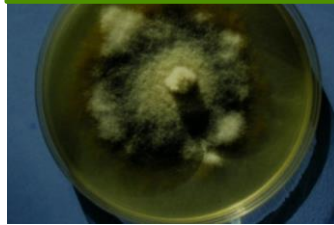
Terrestrial symbiotic (endophytic) fungi



Taxus brevifolia, *T. baccata*
(Pacific / European yew tree)



Taxomyces andraenae

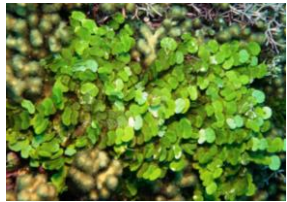


Paclitaxel (Taxol)[®]



Solid cancers

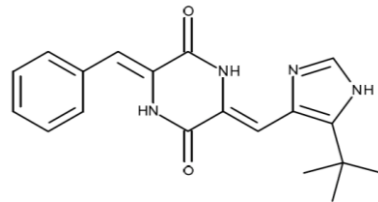
Marine (seaweed) symbiotic fungi



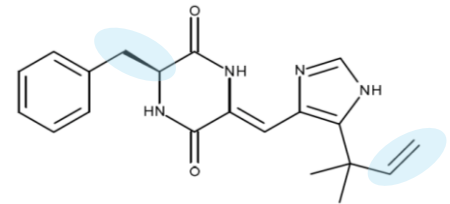
Halimeda copiosa
(Green macroalga)



Aspergillus sp.



Halimide (natural compound)
NCDDG Fenical 2000 -> Nereus



Plinabulin (NPI-2358) deriv.
Phase III clinical trials w/ docataxel
Metastatic non-small cell lung cancer

MarPiM Consortium - Expertise



Marine - Fungal Biotechnology / Chemistry: Upscaled fermentation, compound purification, chemical characterization, *in vitro* tests, Tech Tr.



Bioanalytics - Quantitative Proteomics: Protein target identification / Mechanism of action (MoA) by Digital MicroFluidics (DMF)-Chip technol.



Medicine - *In vivo* molecular Imaging: Determination of the efficacy of the fungal molecules in prevention of metastatic growth in mice



MarPiM - Innovative & Sustainable



- **Talented producers of pharmaceuticals**
- Large genome, high capacity of producing diverse types of molecules
- **Sustainable fermentation** in high volumes, **NO damage** to marine environment
- **Optimization of culture conditions** -> High yield of target compds



- **Innovative, state-of-the-art methods / Multi-omics**
- **Prediction** of chemistry & bioactivity-> **Targeted isolation** of new bioactives
- **Rapid characterization** of bioactive compds (PoC)
- Novel miniaturized on-chip **proteomics platform** for MoA determination
- **Time and cost-efficient**
- **Sensitive quantification of bone structural changes** with serial micro-Computed Tomography

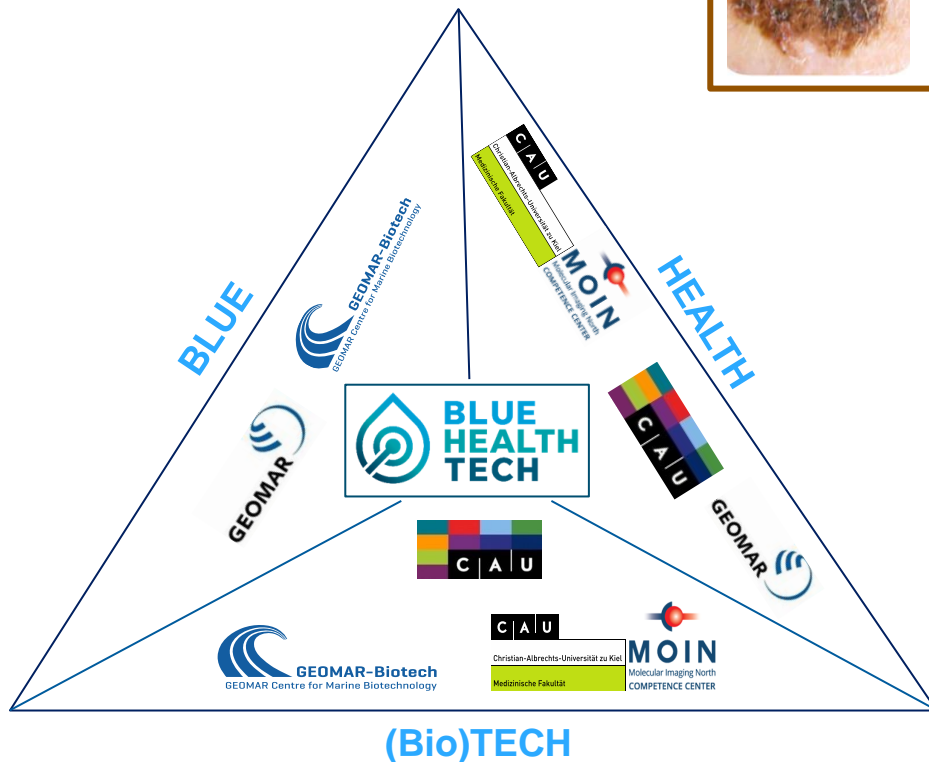
Relation to BHT Goals



Germany (annual figures)

Skin cancer: New cases > 220.000 (SH 6.000)

MM: 23.000 new cases, 3.000 deaths

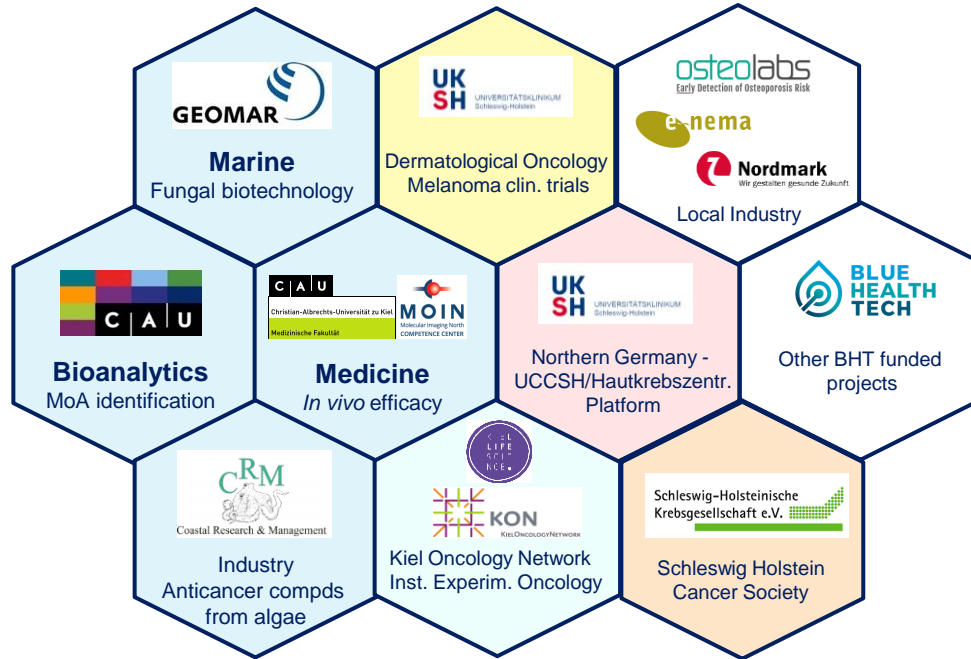


BHT - Marine Wirkstoffe - MarPiM

Discover, develop effective marine molecules

- Prophylactic treatment of metastatic MM
- For long-term dosing for chronic disease
- Improve life & health of the region & beyond
- Innovative and multidisciplinary expert team

Impact - Sustainability for regional structural change



Kiel as Cancer Research Hub

- ✓ Two spin-off companies
- ✓ Strong interactions with academia
- ✓ Strong interactions with industry
- ✓ Local marine biological resources
- ✓ Health as a job motor

Structural Change through Innovation

Thank you!

