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INSTITUTE FOR RESEARCH IN BIOMEDICINE

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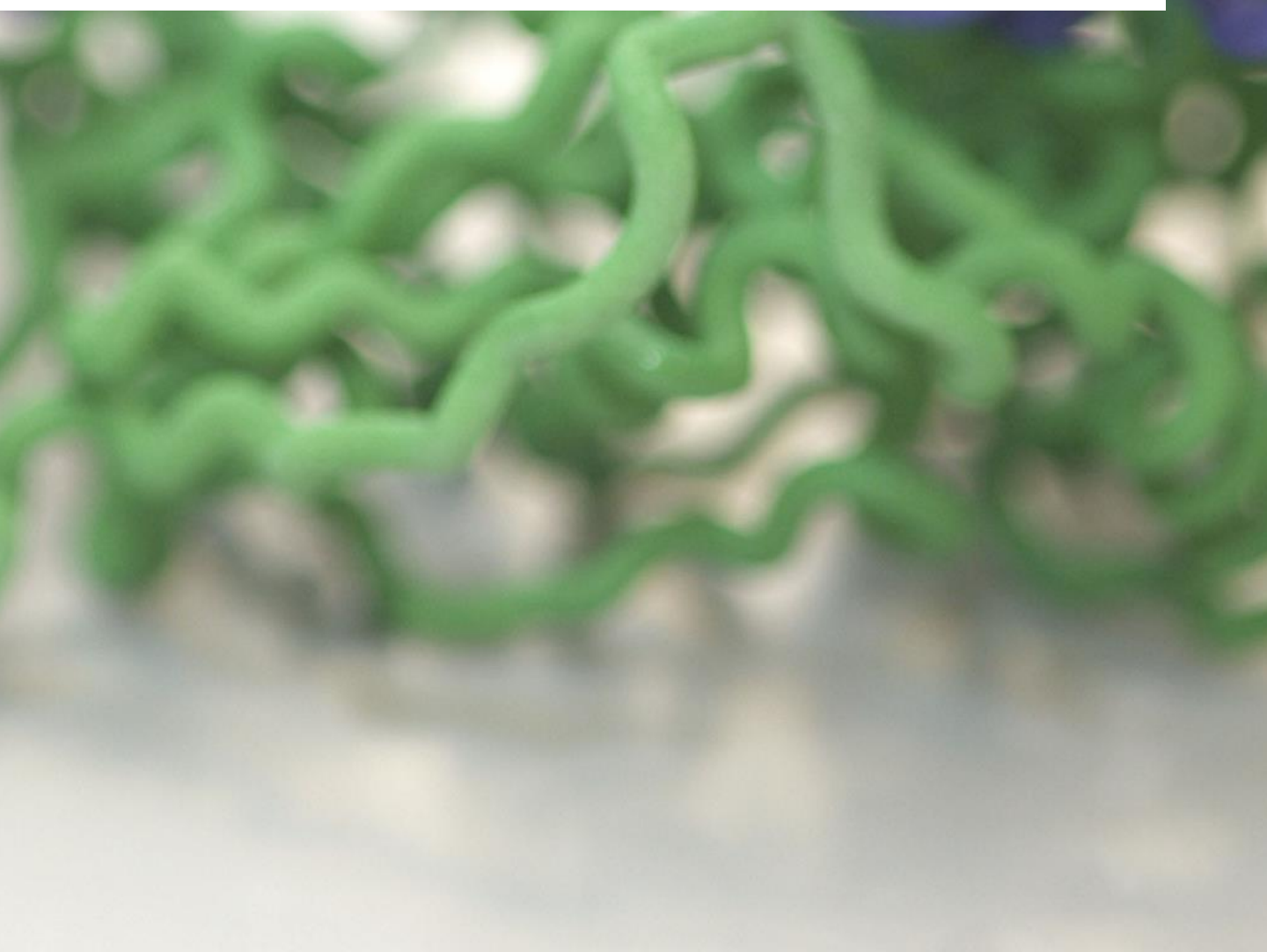
The Institute for Research in Biomedicine (IRB Barcelona) is an independent, non for-profit research center engaged in basic and applied biomedical science. The convergence of biology, chemistry, medicine, physics and computer science at IRB Barcelona provides a unique opportunity for the translation of basic biomedical research into innovation.

MV5 – ANTI-OmpA MOLECULES TO FIGHT MULTIDRUG-RESISTANT GRAM (-) BACTERIAL INFECTIONS



MV5 – ANTI-OmpA MOLECULES TO FIGHT MULTIDRUG-RESISTANT GRAM (-) BACTERIAL INFECTIONS

Antibiotic resistance in a growing number of pathogens has become a serious worldwide health concern. To answer this unmet medical need, a consortium between several research groups has developed a new class of cost/effective molecules which reduce virulence of *A. baumannii, P. aeruginosa* and *E.coli* (the most relevant Gram-negative bacteria in healthcare-associated infections).

MV5 has proven, both *in-vitro* and *in-vivo,* to be a strong inhibitor of bacterial adherence to endothelial cells. When administered at 20 mg/mL to mice previously infected with a lethal dose, MV5 retrieved an 83% survival rate.

CHALLENGE

Antibiotic resistance, or "superbugs" has recently been declared by the World Health Organization (WHO) as one of the greatest threats to human health. In the European Union (EU), Norway and Iceland, 5–12% of hospital patients acquire an infection during their stay. Each year, an estimated 400 000 present with a resistant strain, of whom 25 000 die, on average, according to the European Centre for Disease Prevention and Control. Two thirds of these are due to Gram-negative bacteria.

The **clinical burden associated with resistance is estimated to cost Europe approximately €1.5 billion per year**. Urgent new solutions are needed to fight this widespread threat.

TECHNOLOGY

MV5 represents a **new class of cost/effective molecule which reduces infectiveness** of *A. baumannii, P. aeruginosa* and *E. coli,* the most relevant **Gram negative** bacteria in healthcare-associated infections, even in the cases where a **biofilm is pre-formed** (such as many of the pulmonary infections).

MV5 blocks the adherence of **OmpA** to the epithelial cells of the host representing a **novel mechanism of action** to fight bacteria. This new mechanism is not expected to induce resistance, as it is **not related with bacterial cytotoxicity.**

Competitive advantages associated to MV5 over other anti-infective molecules are predicted to be:

i. **novel biological target** (less resistant strains are expected)
ii. **low production costs** (chemical synthesis)
iii. **high serum half-life** (cyclisation and incorporation of D-aa)
iv. **good Therapeutic Index** (given by preliminary data)
v. **synergy with antibiotics currently in use** (reduced dosis)
vi. **effective against biofilms** (respiratory track infections)

COMMERCIAL OPPORTUNITY

Due to the growing threat of antibiotic resistance, the European Medicines Agency (EMA) has recently announced that it is changing the way it assesses antibiotics, speeding up the development of new treatments, Moreover, EMA provides additional scientific guidance to companies and it is defining a new approach to aid the development of new antibiotics especially targeting multidrug resistant bacteria in areas where there are none or only limited, therapeutic options.

The technology is **patent-protected and available for licensing**.

DEVELOPMENT STATUS

MV5 is currently on the **Hit-to-Lead optimization stage**. It has undergone the 1st round of medicinal chemistry optimization. A new set of molecules has been rationally designed and new and higher potency hits have been identified. Ongoing work is being performed in order to characterize the newly synthesized hits and evaluate both potency, selectivity and toxicology.

Compounds have been evaluated also in terms of synergy with cytotoxic antibiotics. Moreover, a **regulatory pathway for the non-clinical phase** has been set up in collaboration with specialised CROs.

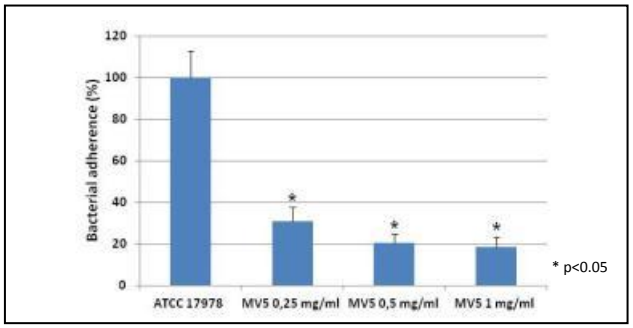


Fig. 1 – A. baumanii (ATCC 17978) adherence to A549 cells (human lung carcinoma cell line) in the presence of different concentrations of MV5.

CONTACT

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PARTNERS

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