



Der Vorsitzende des Promotionsausschusses

---

## EINLADUNG

Hiermit lade ich ein zum öffentlichen Promotionskolloquium von

**Frau M.Sc. Atanaz Shams**  
Wirkstoffdesign und Optimierung  
(Prof. Dr. Anna K. H. Hirsch)

am

**Mittwoch, 10. September 2025, 16:00 Uhr s.t.**

per Videokonferenz: Link für MS Teams: <https://bit.ly/4oBSVp5>  
Raum für die Prüfung: HIPS, Gebäude E 8.1, Seminarraum EG 0.27

### Thema der Dissertation:

#### **Exploring pantothenate energy-coupling factor (ECF) transporters as a novel antibiotic target**

Antimicrobial resistance (AMR) is a growing global health crisis, largely driven by the misuse of antibiotics. To combat multidrug-resistant pathogens, novel therapeutic strategies are urgently needed. One emerging approach is to target bacterial nutrient acquisition systems, particularly energy-coupling factor (ECF) transporters responsible for vitamin uptake. This study focuses on ECF-FoIT2 and ECF-PanT, which mediate folate and pantothenate import, respectively. We identified a selective inhibitor, hit 1, that impairs bacterial growth by blocking these transporters without affecting human cells or unrelated ABC transporters. Biochemical assays, mutagenesis, as well as in vivo and in vitro assays confirmed its specificity and mechanism of action. Inhibition of pantothenate uptake was especially effective in *Streptococcus pneumoniae*, which depends on external sources for this vitamin. These findings highlight the vulnerability of bacterial vitamin dependency and suggest ECF transporters as promising drug targets. By disrupting nutrient import, this work introduces a novel antimicrobial concept. Such strategies may play a crucial role in overcoming antibiotic resistance.

Saarbrücken, 26. August 2025

Prof. Dr.-Ing. Georg Frey