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Winner 2019
Georg Winter,
Austria

Georg Winter, Eppendorf Young Investigator 2019

»I felt incredibly honored and humbled when I learned that I will be awarded with the 2019 Eppendorf Award. This price recognizes our work in innovating a generalizable solution to targeted protein degradation in vivo. We are pursuing this new therapeutic paradigm towards our ultimate goal of degrading disease-relevant proteins that are thus far deemed "undruggable". My contribution to this exciting field would not have been possible without groundbreaking work from esteemed peers, the amazing support from mentors, and close and fruitful collaborations with colleagues in the lab.«

Georg Winter

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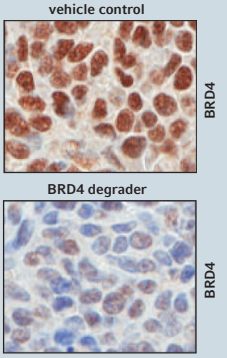
Award-Winning Research



Immunohistochemistry for BRD4. Displayed are representative tumors of mice treated either with a BRD4-degrader drug, or with vehicle control.

Thousands of proteins have been linked to the pathogenesis of different, life-threatening diseases. Research in the field of life sciences has nominated many of these proteins as promising targets for therapeutic intervention. However, the majority of these findings have not been translated into novel therapeutic strategies. The reason for this unsatisfying gap in the innovation of new medicines is that up to 80% of all human proteins are currently considered "undruggable". This means that they are inaccessible for traditional drug development strategies, which are often geared towards inhibition of a distinct biochemical activity. Over the last 5 years, our research has addressed this bottleneck via the innovation of a novel paradigm in the development of small-molecules. Instead of developing drugs that inhibit protein function, we set out to design a novel class of molecules that induces the complete elimination of the disease-causing proteins. In brief, these molecules are heterobifunctional in nature, thus allowing simultaneous binding to two different proteins: the disease-causing protein and an E3 ubiquitin ligase. Drug binding induces molecular proximity of both proteins and thus "hijacks" the E3 ligase to poly-ubiquitinate the target protein, prompting its degradation via the proteasome. We believe that this fundamentally different pharmacology has the potential to revolutionize treatment opportunities for many different diseases. Most disease-linked proteins don't have a defined biochemical activity that can be blocked via a small-molecule. However, for many of them it will be feasible to design small-molecule ligands that simply bind them, thus serving as an anchor point for E3 ligase recruitment via bifunctional molecules. The first molecules that operate via this mechanism have recently entered first clinical investigation in humans and there is a strong rationale that many more will follow to ultimately empower us to "degrade the undruggable".

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