

Discovery of precision degrader antibody conjugates (pDACs) employing novel SMARCA2/4 degrader payloads

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Degrader-Antibody Conjugates (DACs): Recent Developments, Challenges, and Opportunities
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Disclosures & Financial Relationships

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Andrew Buesking is an employee and shareholder of Prelude Therapeutics Incorporated.

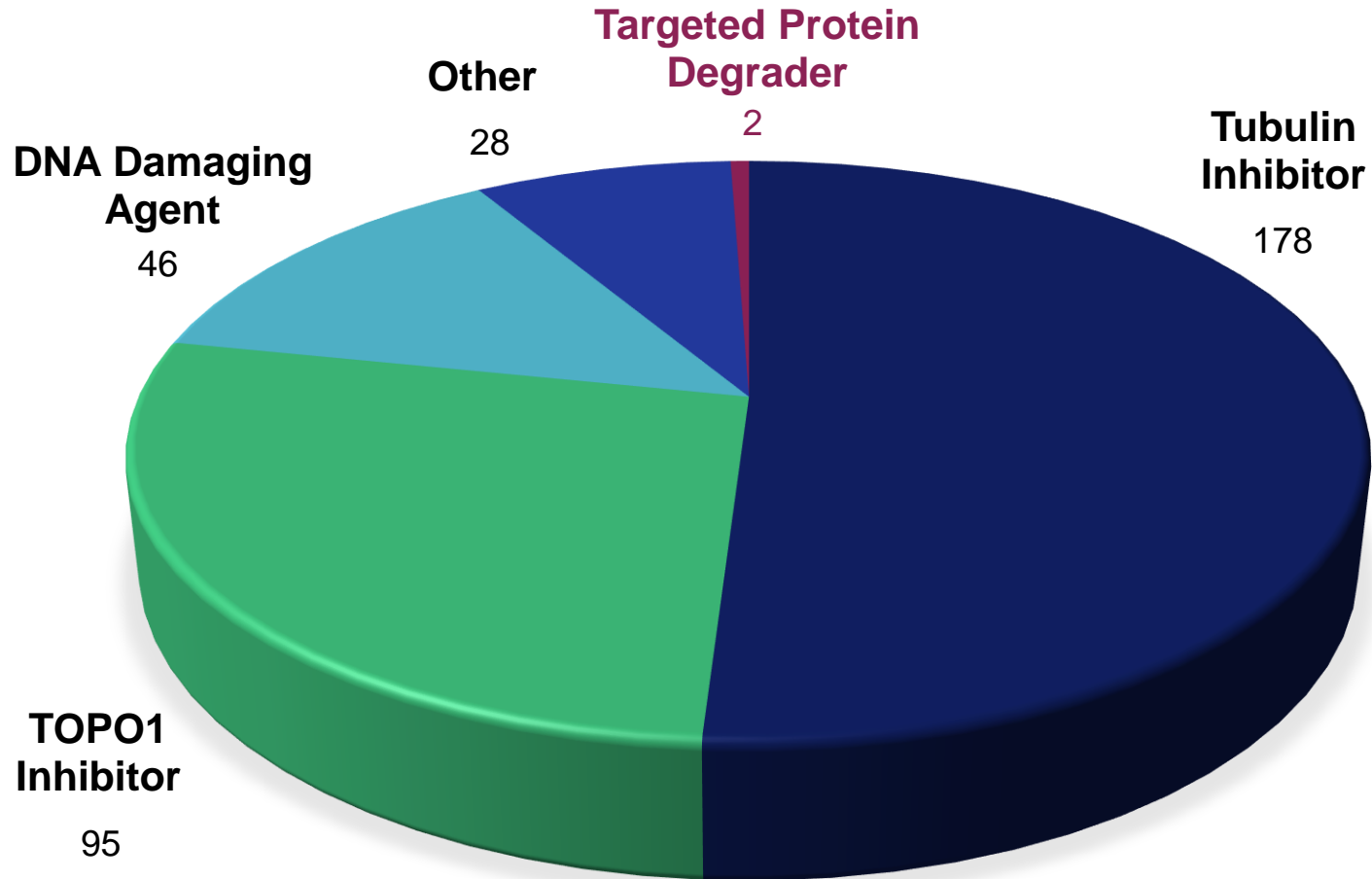
To date, ADCs deliver meaningful benefit but fall short of “magic bullet” ideal

- “Magic bullet” concept (Ehrlich, 1900’s) continues to inspire targeted drug design
- Currently, 14 FDA-approved are helping patients
- ADCs improve efficacy compared to unconjugated payload but possess similar MTD
- Tumor enrichment observed but inefficient targeting results in vast majority of ADC distributing to non-target tissues
- Notable adverse events observed across ADC clinical trials

Continued innovation can advance scope and tolerability of ADCs



Degraders remain under-represented payload class

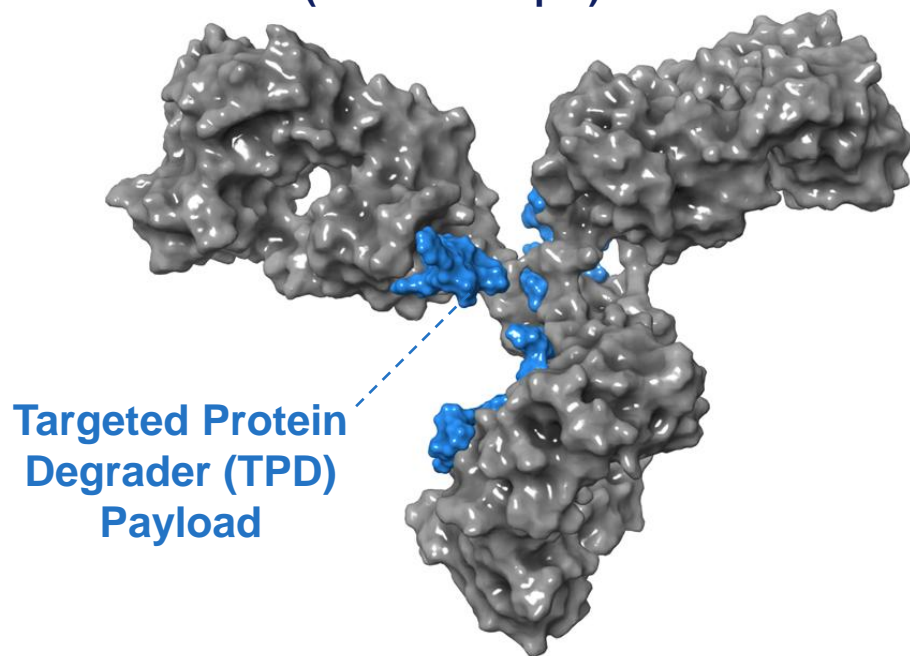


- Most next-gen, clinical ADCs use just three classes of cytotoxic payloads
- TPD payloads offer exceptional potency and opportunities for additional benefits of precision
- TPD properties can be designed to limit undesired exposure through clearance and cell-penetration
- TPD payloads offer potential to avoid genotoxicity liabilities
- TPDs can expand reach of ADCs to cancers and other therapeutic areas beyond traditional cytotoxics

Precision degrader antibody conjugates (pDACs) represent next generation of ADCs

Model of Precision DAC

(DAR 4 example)

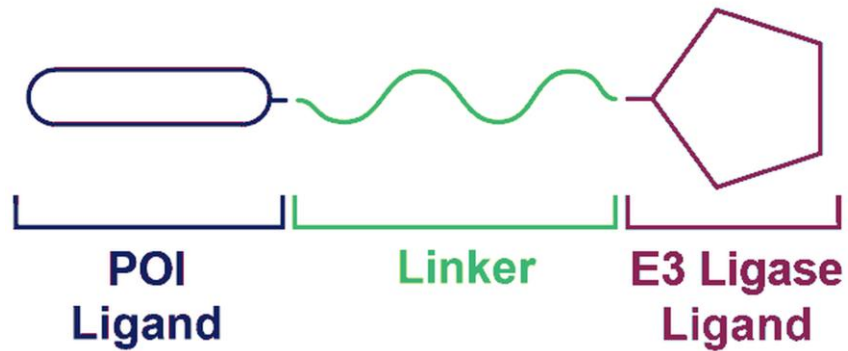


Property	Traditional ADC	Precision DAC
Potency	✓	✓
Antibody Selectivity	✓	✓
Payload Selectivity	✗	✓
PD Marker - Payload	✗	✓
Non-Genotoxic	✗	✓

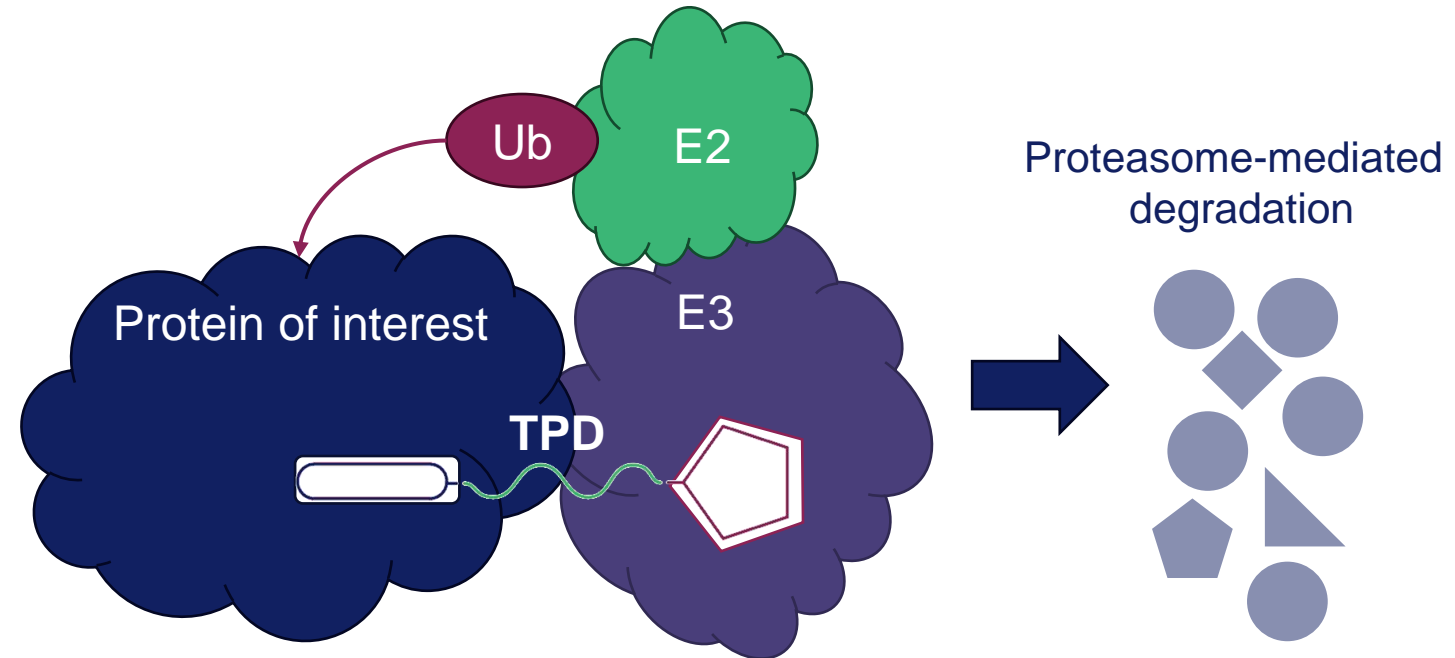
- **Precision DACs enable improved selectivity in two ways**
 - ✓ **Antibodies** target tumor-specific cell surface antigens sparing healthy cells
 - ✓ **Targeted Protein Degraders** address critical proteins in validated biological pathways
- **Potential to deliver both improved efficacy and improved tolerability**

Targeted protein degraders represent emerging therapeutic class with unique advantages as payloads

Components of heterobifunctional degrader



Mechanism of ubiquitin-proteasome degradation

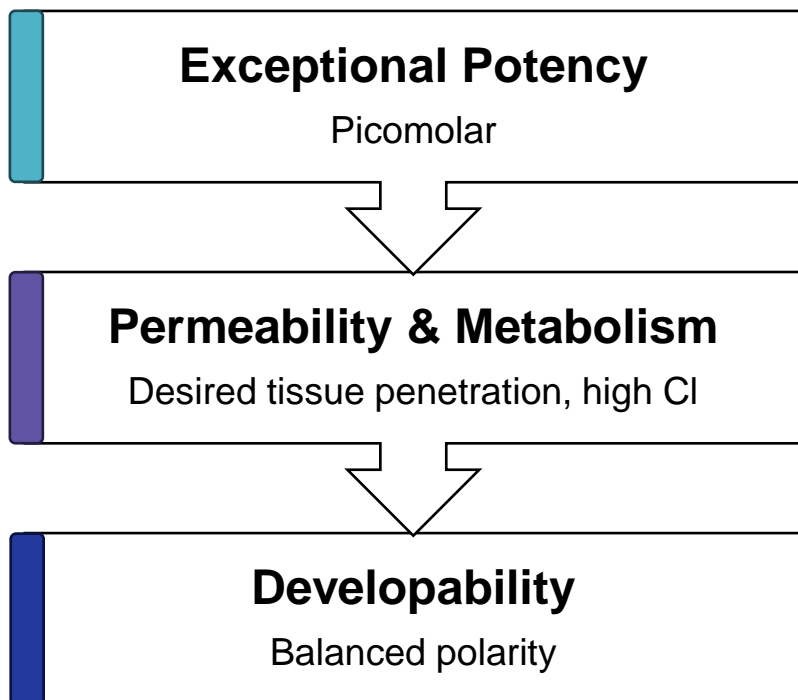


Advantages of Targeted Protein Degrader (TPD) Technology

- Excellent potency and catalytic activity (event-driven pharmacology)
- Prolonged pharmacodynamic effects resulting from protein resynthesis
- Possibility for enhanced pharmacology beyond enzymatic function including targeting protein-protein interactions and disrupting protein complex assembly

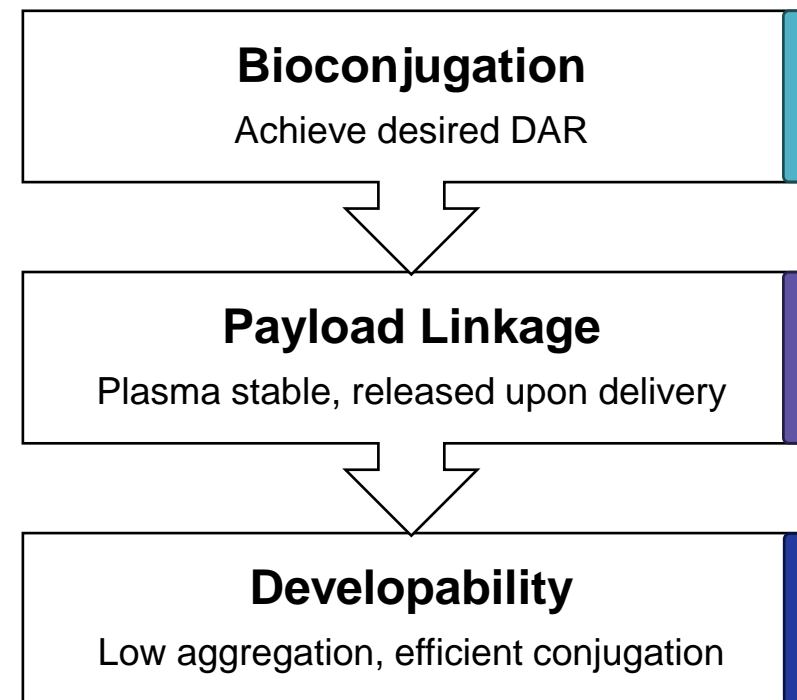
Medicinal chemistry drives integrated payload and payload-linker optimization

Payload Optimization



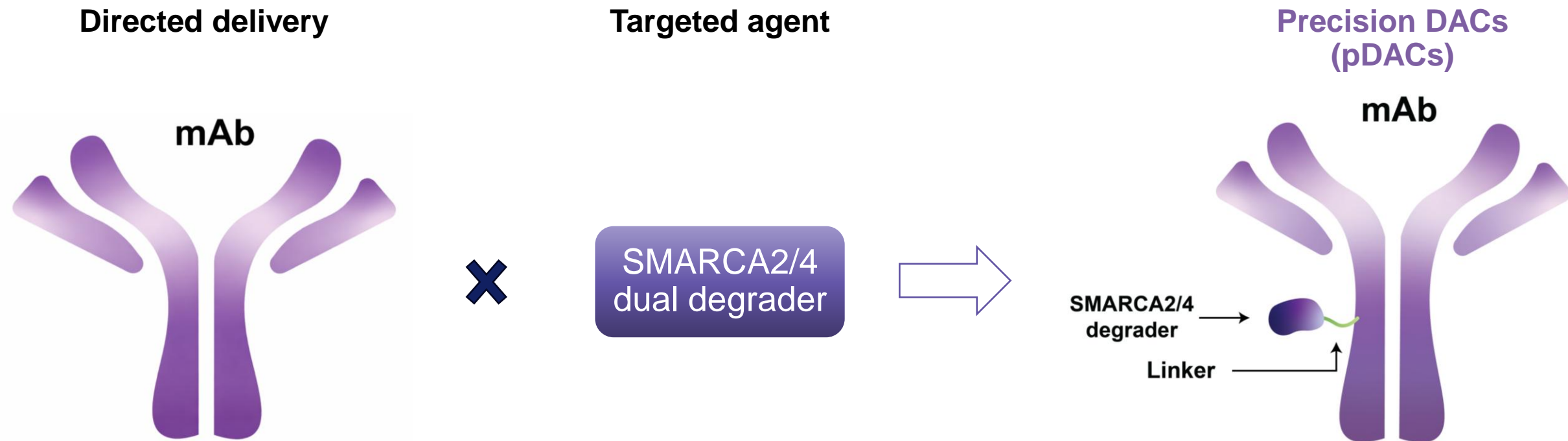
Constant
feedback

Payload-Linker Optimization



- Integrated design-build-test cycles accelerate discovery of payloads, payload-linkers, and pDACs
- Iterative workflows provide continuous feedback across platform to identify best pDAC candidates

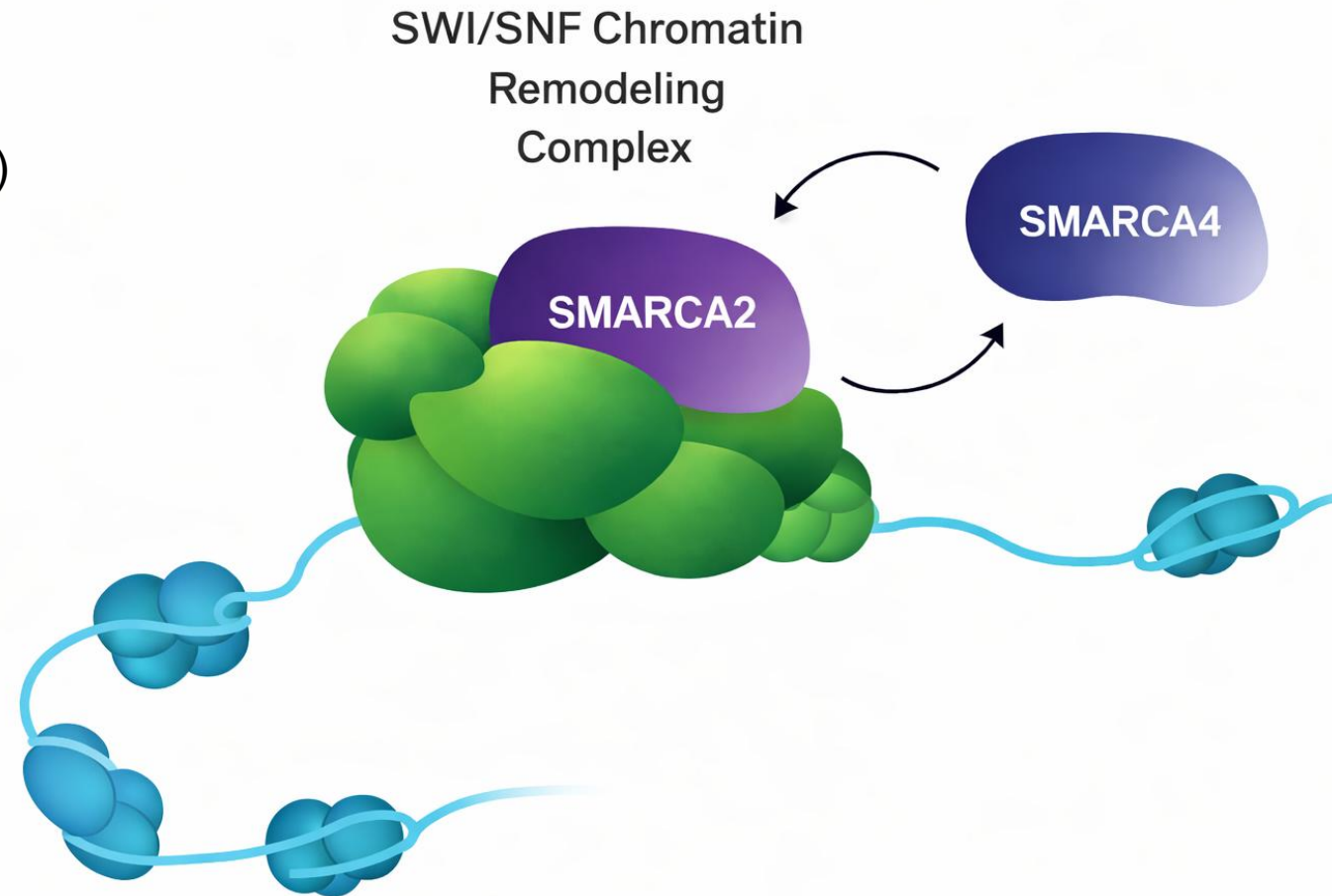
Leveraging directed antibodies and targeted SMARCA2/4 degraders to generate pDACs



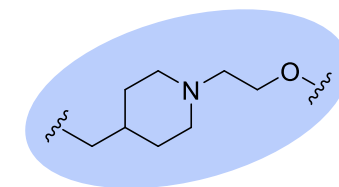
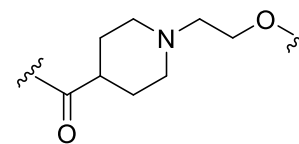
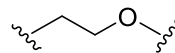
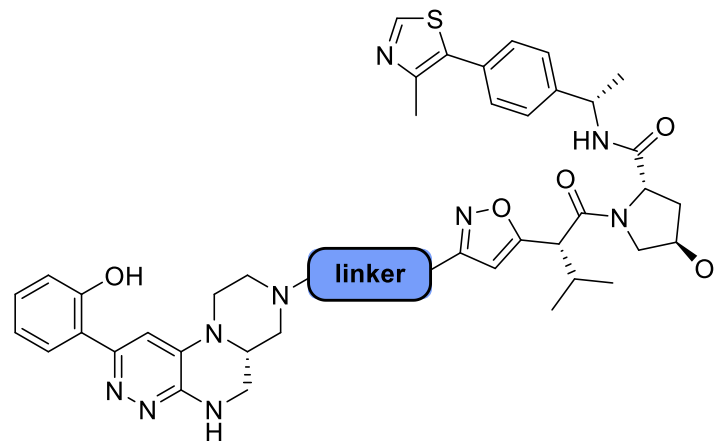
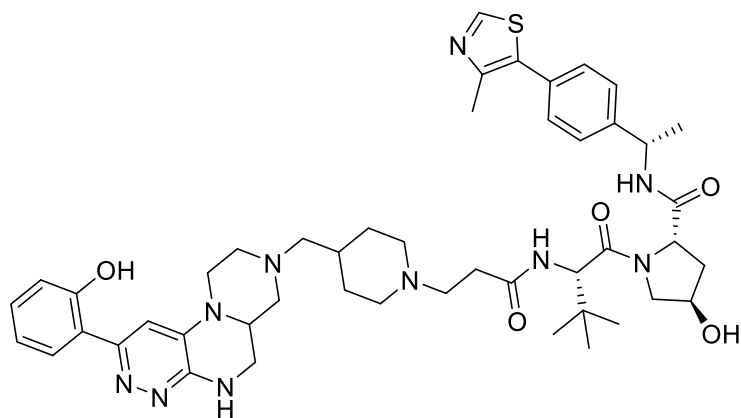
Harnessing this double targeting holds potential to unlock new era of precision medicine

Utilizing SWI/SNF dependence to build precision ADCs with SMARCA2/4 payloads

- SWI/SNF complex is a major chromatin remodeling complex containing ATPase catalytic subunit
 - Either SMARCA2 (BRM) or SMARCA4 (BRG1)
- Transcription factor (TF)/enhancer-driven cancers including prostate cancer highly dependent on SWI/SNF chromatin remodeling complex
 - SMARCA2/4 dual inhibitors/degraders suppress specific types of cancers
 - Selecting these SMARCA2/4-dependent indications imparts layer of precision
- pDAC approach could provide balance of deep responses and tolerability
 - Dual inhibitor/degraders not well tolerated as systemic agents due to dependence of normal cells on SMARCA2/4



VHL ligand and linker SAR drive three-order of magnitude potency increase

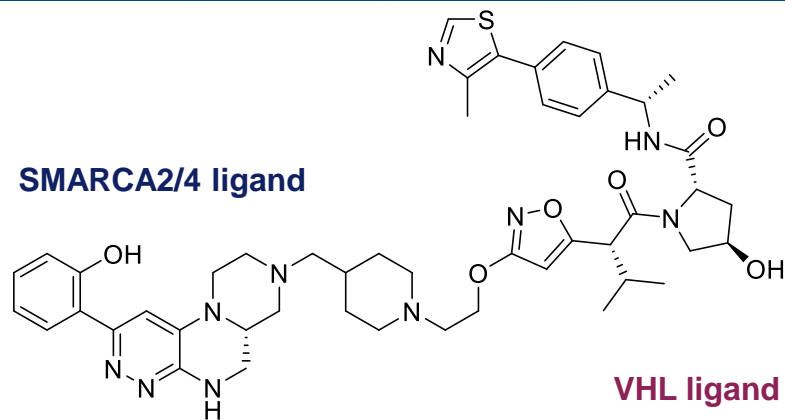


HiBit	2
SM2 DC ₅₀ (nM) (D _{max})	304 (88%)
SM4 DC ₅₀ (nM) (D _{max})	--
Selectivity	--

3	4	5
3.9	4.4	0.37
60	6.8	2.7
15x	1.5x	7.3x

- Isoxazole-containing VHL ligand improved degradation potency
- Linker structure influenced both potency and selectivity
- Very potent, dual SMARCA2/4 degrader **5** selected for further investigation as payload

Novel SMARCA2/4 dual degrader payload demonstrates potency and precision

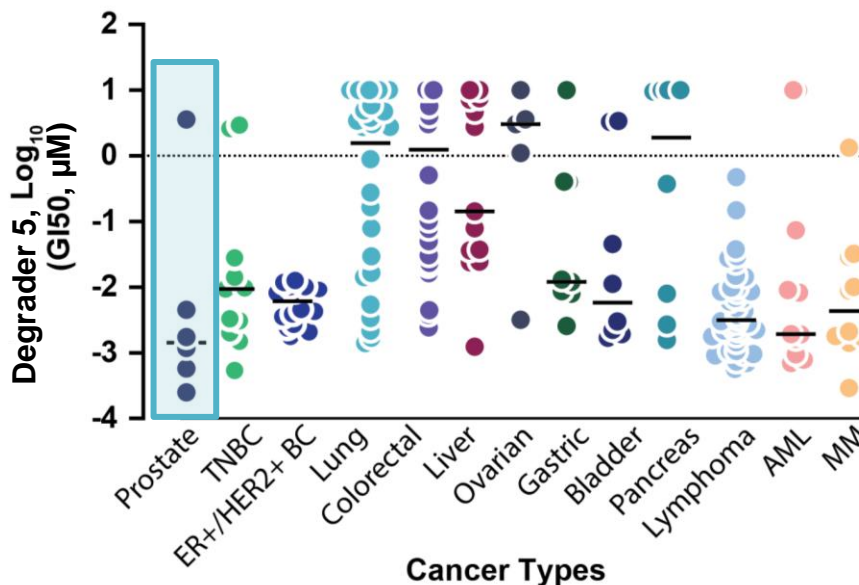


Potency & selectivity assays

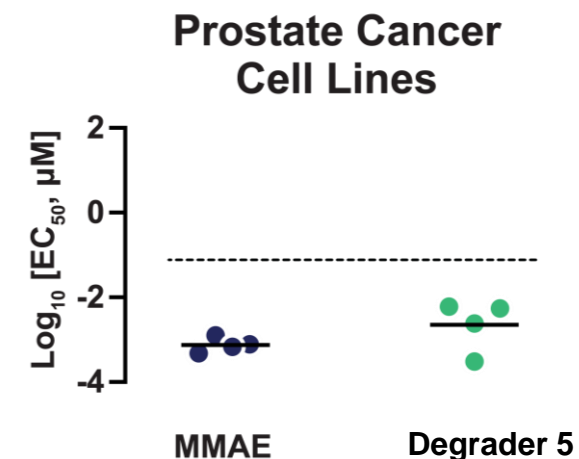
5

HeLa HiBit SM2 DC ₅₀ (pM) (D _{max})	370 (97%)
HeLa HiBit SM4 DC ₅₀ (pM) (D _{max})	2,700 (96%)
Fold Selectivity SM4/SM2	7.3x
LNCaP prolifer EC ₅₀ (pM)	210 (96%)
hIntCl HLM mL/min/kg (%HBF)	16 (77%)

GI₅₀ in cancer cell panel



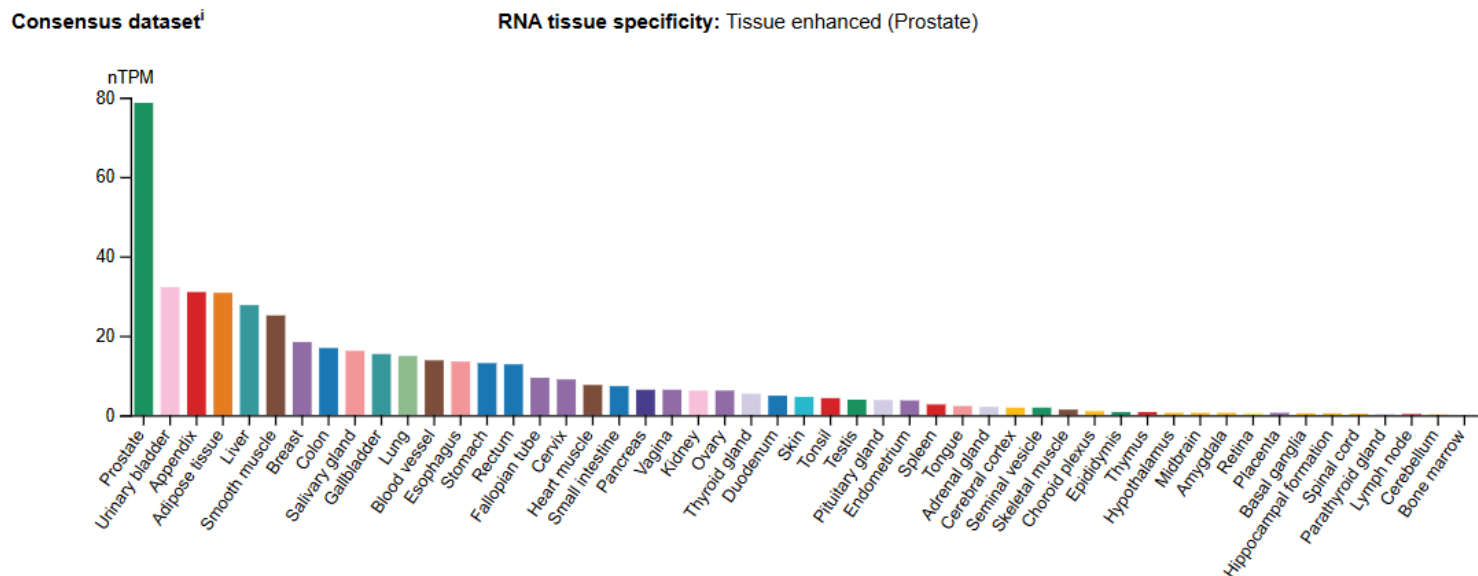
EC₅₀ in prostate cell panel



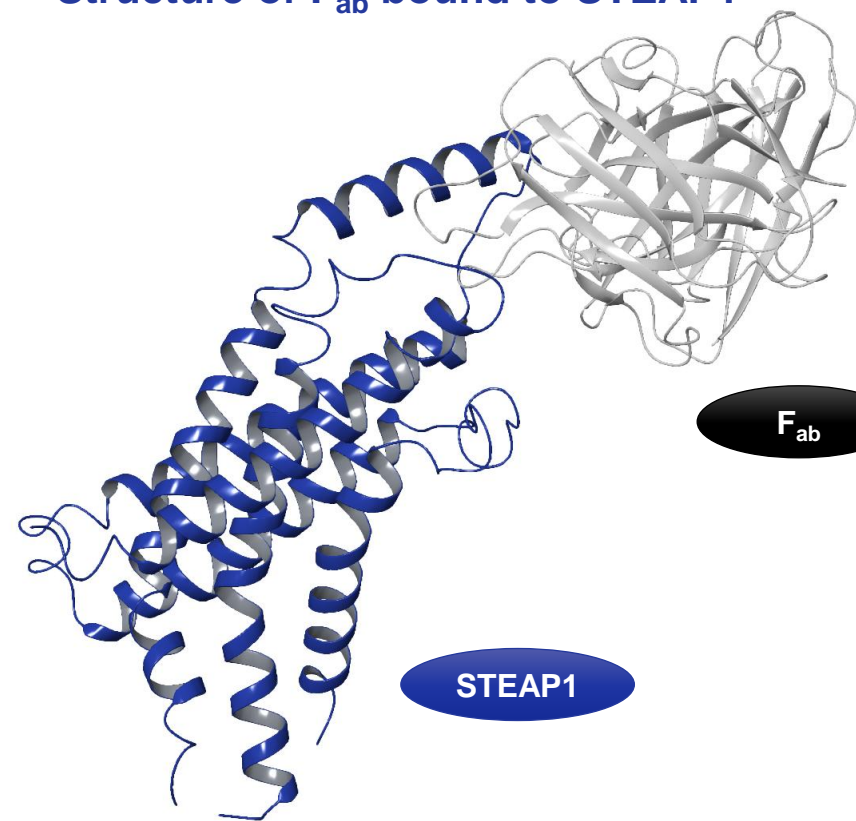
- Identified potent, dual SMARCA2/4 degrader **5** with exceptional potency in prostate cancer cells
- High clearance to limit prolonged systemic exposure that could erode therapeutic index
- Consistent with targeted approach, range of activity in other cancer types (even >1 μM in some cases)
- Potency comparable to cytotoxic payload MMAE in prostate cancer cells

Six-transmembrane epithelial antigen of prostate 1 (STEAP1): Representative antigen target for novel SMARCA2/4 pDACs

STEAP1 transcript expression across tissue types



Structure of F_{ab} bound to STEAP1

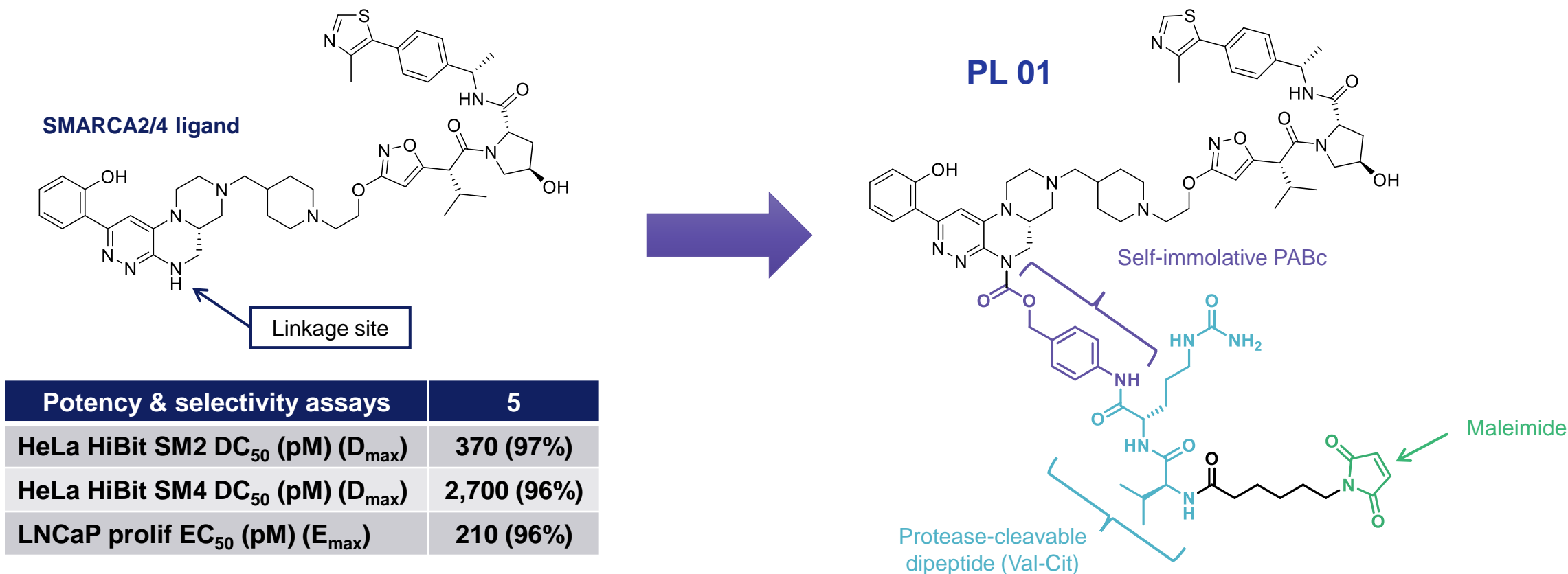


- STEAP1 is a transmembrane metalloredutase and expressed in >85% prostate cancer
- STEAP1 transcript expression enriched in prostate tissue with less expression in other normal tissues
- Antibodies including vandortuzumab recognize extracellular domain and used in clinical ADCs

1) "ENSG00000164647 (STEAP1)." <https://www.proteinatlas.org> (graph extracted Feb 2026) 2) Sing, R.; Kyte, J. A. *Trends in Cancer*, **2025**, *11*, 722-725.

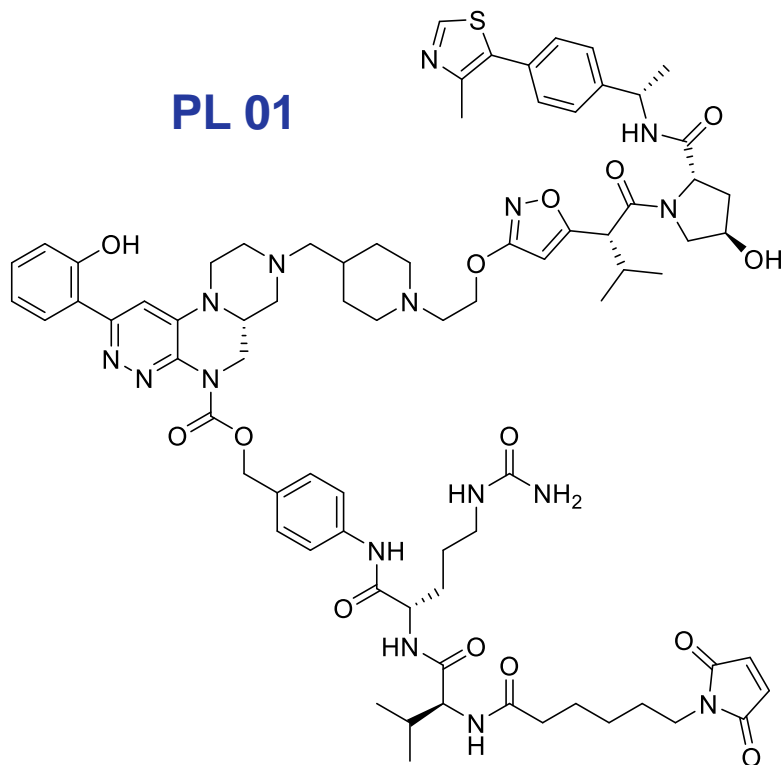
3) Structure visualized using PDB code 6Y9B.

Design of SMARCA2/4 payload-linker utilizes *N*-linkage and state-of-art linker



- SMARCA2/4 binder N–H selected as facile site of linker attachment
- Initially selected protease-cleavable, dipeptide linker with self-immolative PABc

Facile conjugation of payload-linker affords STEAP1 x SMARCA2/4 pDAC



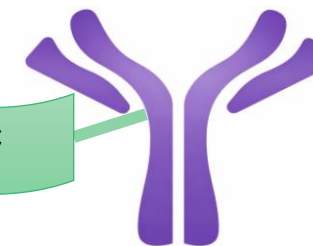
conjugation



polishing

Degrader 5

PABc-Cit-Val-MC



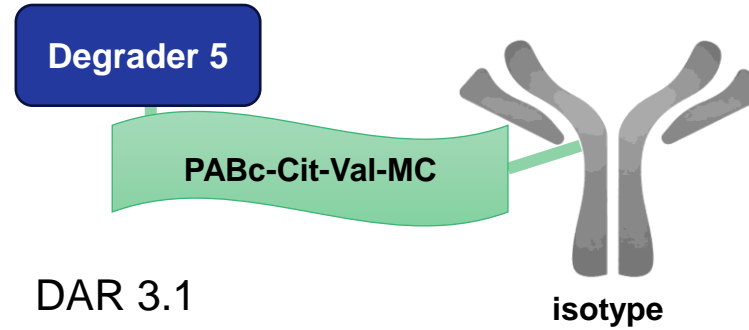
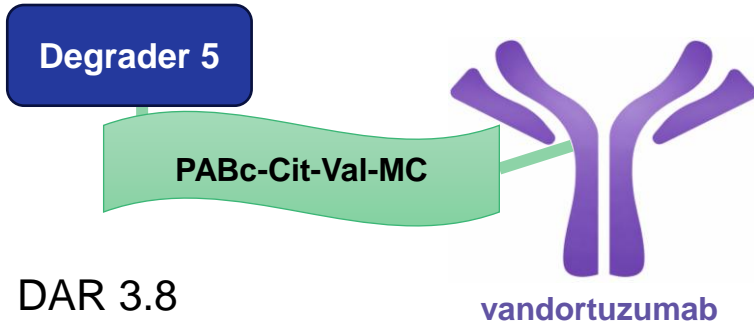
vandortuzumab

Property	DAC 01
Initial aggregation (%) ^a	27
DAR (average)	3.8
Monomeric purity (%)	97

^aAggregation (%HMWS) under standard, unoptimized conditions.
An early metric for developability.

- **PL 01** conjugated via stochastic, native-cysteine conjugation
- Anti-STEAP1 antibody vandortuzumab selected as case study
- Bioconjugation provided ADCs with acceptable DAR and properties

Initial payload modestly active when conjugated to vandortuzumab



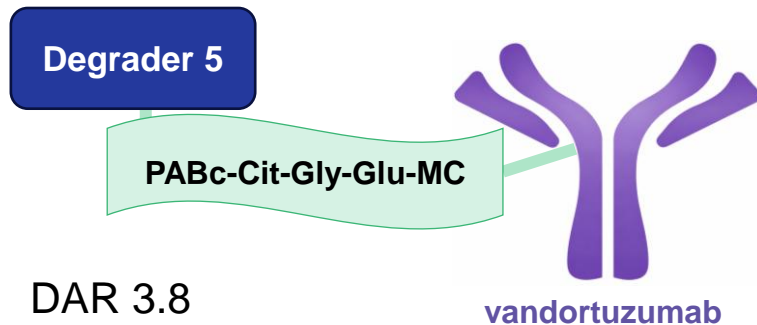
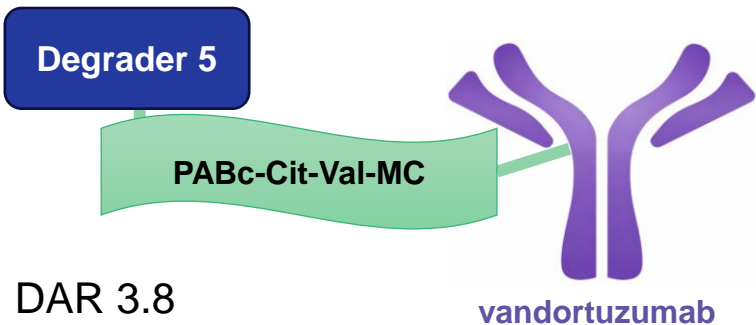
Potency (ng/mL)	DAC 01
LNCaP SM2 DC ₅₀ (D _{max})	75 (88%)
LNCaP SM4 DC ₅₀ (D _{max})	2700 (50%)
LNCaP prolifer EC ₅₀ (E _{max})	460 (86%)

LNCaP STEAP1+.

DAC 02
1000 (55%)
>1200 (7%)
610 (75%)

- Acceptable SMARCA2 degradation and modest SMARCA4 degradation observed for DAC 01
- Isotype control suggested degradation activity was differentiated from background
- Antiproliferation activity observed but indistinguishable from isotype control

Varying linker composition provided comparable degradation potencies



Potency (ng/mL)	DAC 01
LNCaP SM2 DC ₅₀ (D _{max})	75 (88%)
LNCaP SM4 DC ₅₀ (D _{max})	2700 (50%)
LNCaP prolifer EC ₅₀ (E _{max})	460 (86%)

DAC 03
87 (85%)
930 (82%)
135 (91%)

LNCaP STEAP1+.

- Additional cleavable peptide sequences possessed similar degradation potency
- Appeared to rule out inefficient release as major factor
- Hypothesized that additional payload potency could be required to drive pDAC activity

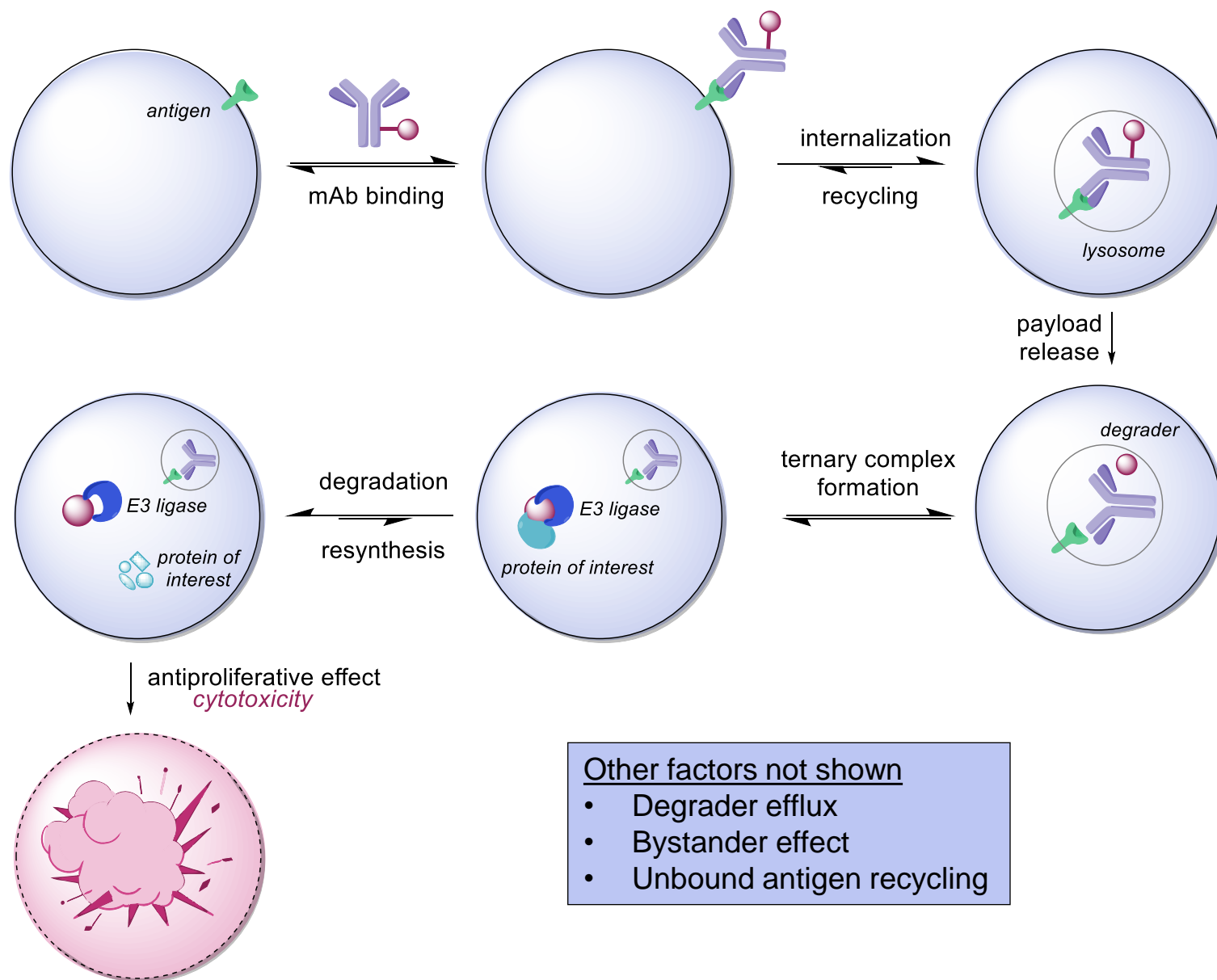
Myth 1



Off-the-shelf MYTH

Degrader payloads are catalytic, so they do not need to be as potent

Exceptional potency to support complex mechanism



Rationale

- Delivery efficiency
 - Payload delivery <1%
- Unique, kinetic mechanism
 - Induced proximity
 - Catalytic activity
 - Time-dependent degradation
 - Resynthesis required
- Translation
 - Degradation triggers cytotoxicity
 - Target-specific degradation threshold

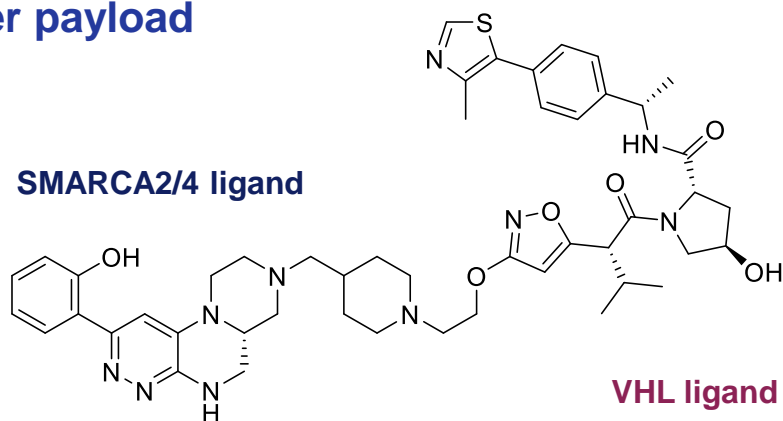
1) Hong, K. B.; An, H. *J. Med. Chem.* **2023**, *66*, 140.

2) Bensch, F.; et al. *Theranostics.* **2018**, *8*, 4295.

3) Casi, G.; Neri, D. *J. Med. Chem.* **2015**, *58*, 8751.

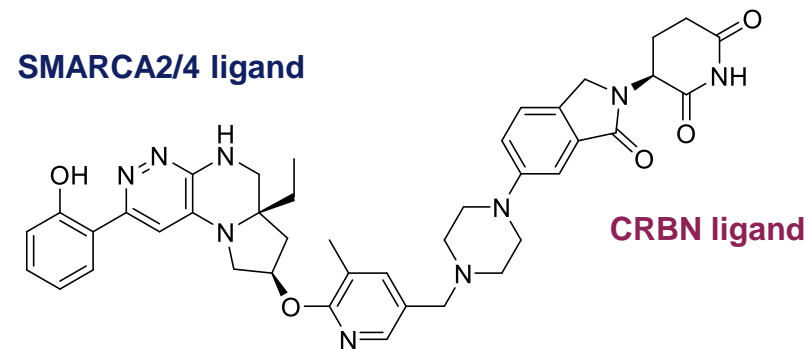
CRBN-based degrader payload more potent than VHL-based payload

VHL-based degrader payload



Potency assays	5
HeLa HiBit SM2 DC ₅₀ (pM) (D _{max})	370 (97%)
HeLa HiBit SM4 DC ₅₀ (pM) (D _{max})	2,700 (96%)
Fold Selectivity SM4/SM2	7.3x
LNCaP prolifer EC ₅₀ (pM) (E _{max})	210 (96%)
hIntCl HLM mL/min/kg (%HBF)	16 (77%)

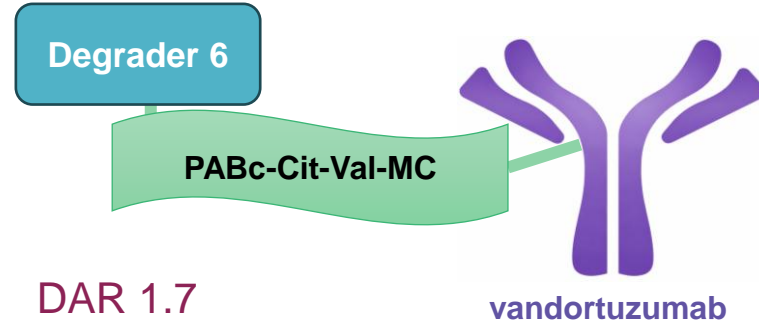
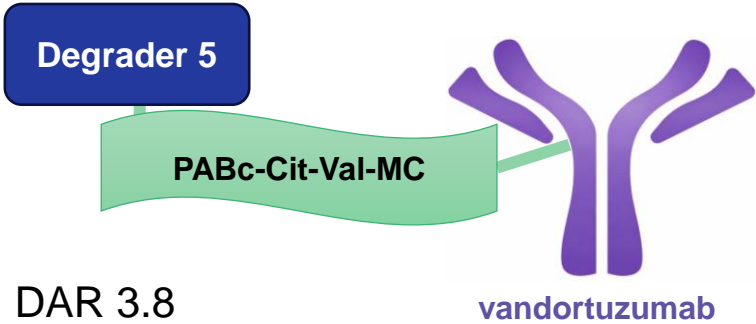
CRBN-based degrader payload



6
40 (97%)
90 (97%)
2x
74 (93%)
19 (90%)

- CRBN-based degrader **6** provided additional potency over degrader VHL-based payload **5**
- Difference most notable in SMARCA4 with 30-fold increase in degradation potency
- Maintained high clearance to minimize free payload exposures

Initial CRBN-based degrader conjugates hampered by lower DAR



Potency (ng/mL)	DAC 01
LNCaP SM2 DC ₅₀ (D _{max})	75 (88%)
LNCaP SM4 DC ₅₀ (D _{max})	2700 (50%)
LNCaP prolifer EC ₅₀ (E _{max})	460 (86%)

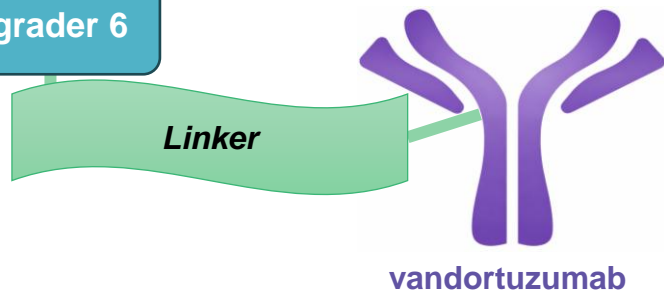
DAC 05
290 (82%)
2600 (60%)
2300 (86%)

LNCaP STEAP1+.

- Properties of payload **6** and initial dipeptide linker limited conjugation to DAR 2
- Resulting pDAC notably less potent both in SMARCA4 degradation and antiproliferation
- Suggested payload-linker physicochemical needed to be adjusted

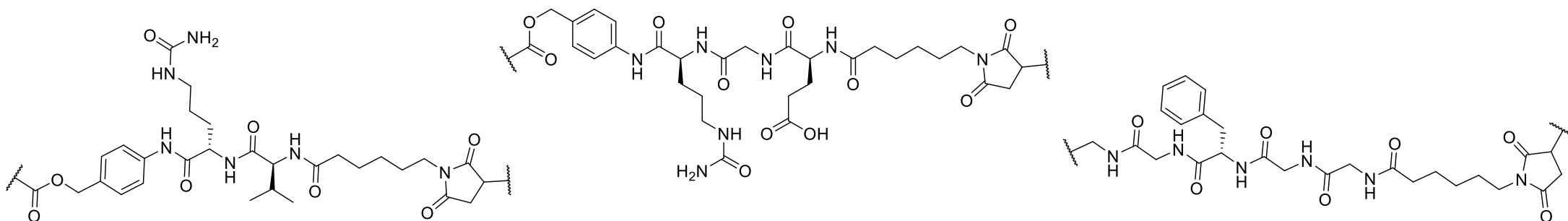
Exceeding DAR 2 with traditional peptide linkers proved challenging

Degrader 6



- Modification of peptide sequence reduced aggregation during conjugation
- Aggregation associated with calculated lipophilicity of payload-linker
- These modifications did not afford isolable DAR > 2

Linker



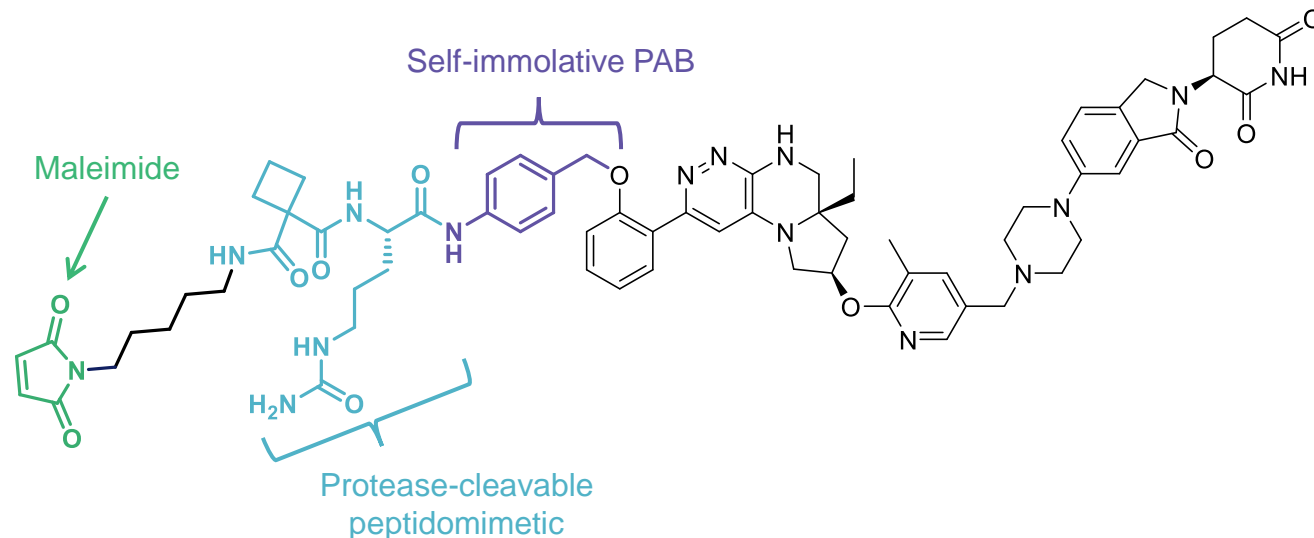
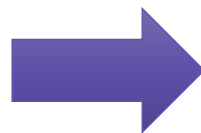
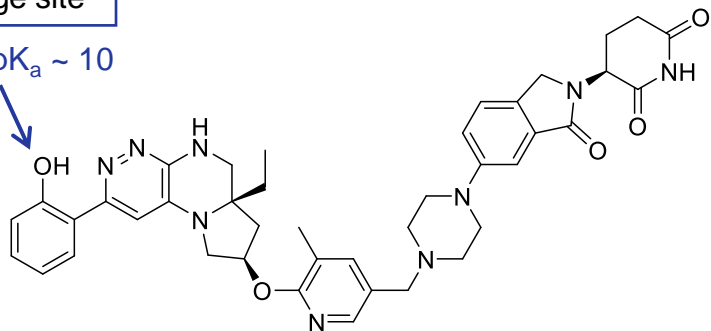
	DAC 05	DAC 06	DAC 07
Linker designation	PABc-Cit-Val-MC	PABc-Cit-Gly-Glu-MC	AMA-Gly-Phe-Gly-Gly-MC
XLogP ^a	5.1	0.74	2.7
Initial aggregation ^b	23%	8%	6%
Isolated DAR	1.7	1.7	1.7

^aCalculated logP of payload-linker. ^bAggregation (%HMWS) under standard, unoptimized conditions. An early metric for developability.

Next-gen design of SMARCA2/4 payload-linkers utilizing O-linkage

Linkage site

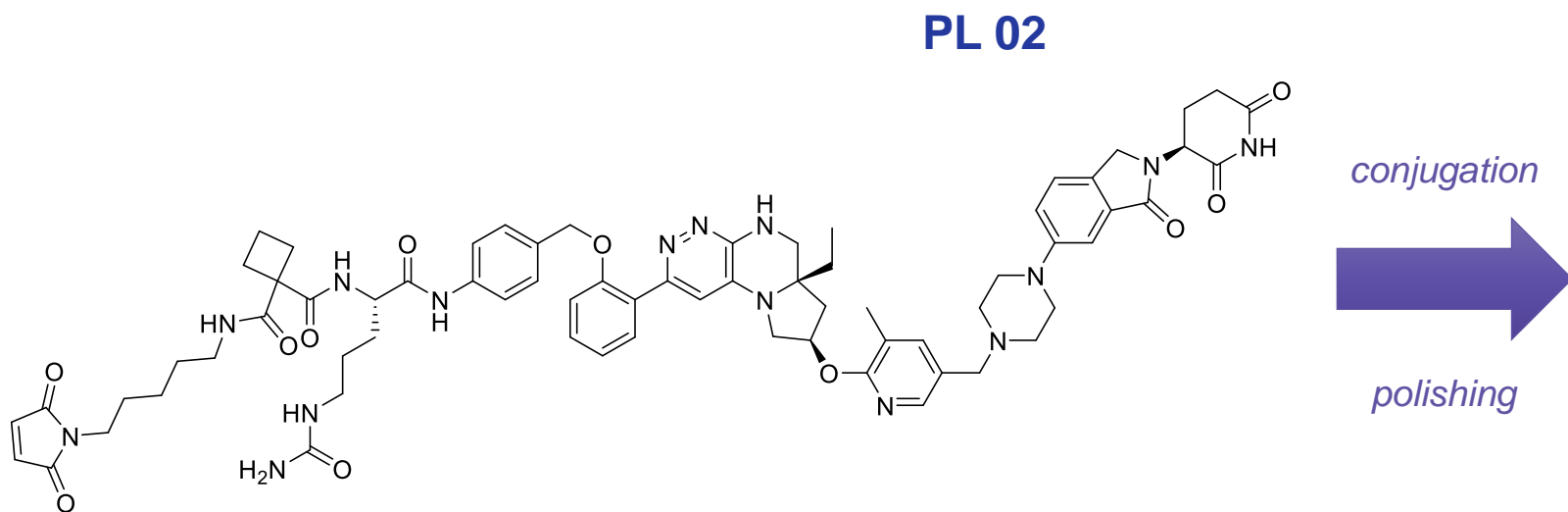
phenol $pK_a \sim 10$



Potency & selectivity assays	6
HeLa HiBit SM2 DC_{50} (pM) (D_{max})	40 (97%)
HeLa HiBit SM4 DC_{50} (pM) (D_{max})	90 (97%)
LNCaP prolifer EC_{50} (pM) (E_{max})	74 (93%)

- Explored chemically diverse architecture with unique properties to improve conjugatability
- Acidic O–H of degrader phenol selected as new linker attachment site
- Identified protease-cleavable, peptidomimetic linker with self-immolative PAB

Conjugation of chemically diverse payload-linker afforded pDAC with higher DAR



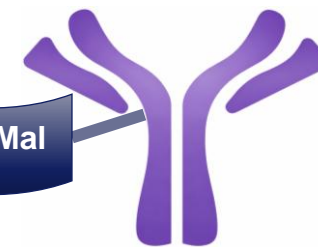
conjugation



polishing

Degrader 6

PAB-Cit-cBu-C₅H₁₀-Mal



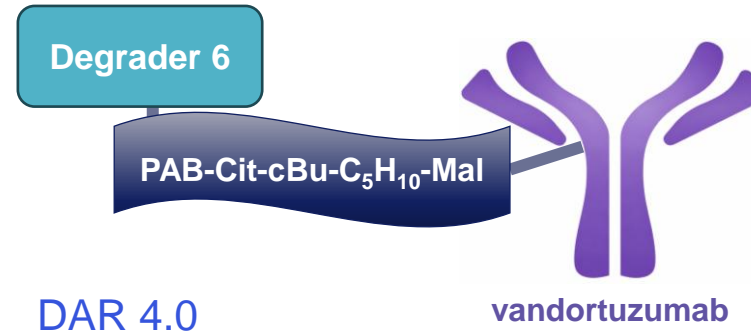
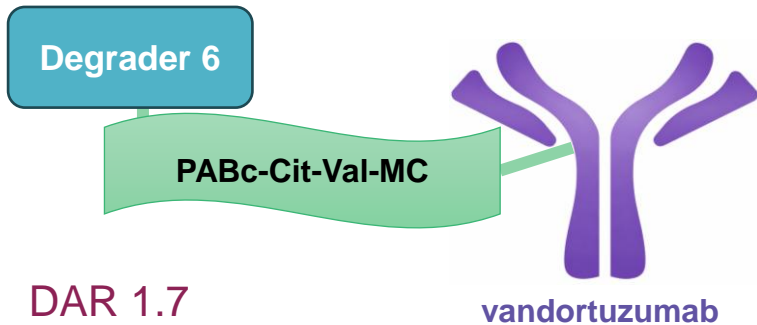
vandortuzumab

Property	DAC 08
Initial aggregation (%) ^a	<1
DAR (average)	4.0
Monomeric purity (%)	99

^aAggregation (%HMWS) under standard, unoptimized conditions. An early metric for developability.

- **PL 02** conjugated via stochastic, native-cysteine conjugation
- Bioconjugation provided pDAC with DAR 4 and good properties

Higher DAR improves degradation potency but not antiproliferation activity



Potency (ng/mL)	DAC 05
LNCaP SM2 DC ₅₀ (D _{max})	290 (82%)
PC3 SM2 selectivity	10x
LNCaP SM4 DC ₅₀ (D _{max})	2600 (60%)
PC3 SM4 selectivity	3x
LNCaP prolifer EC ₅₀ (E _{max})	2300 (86%)

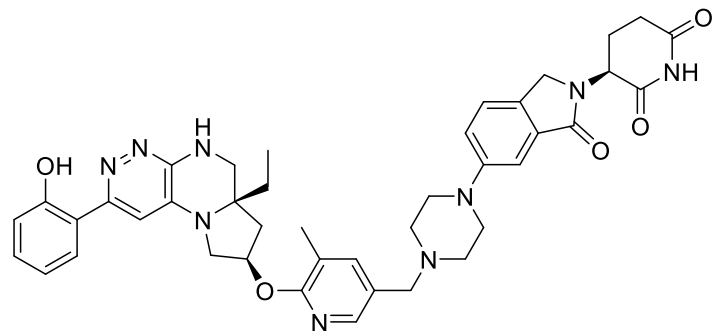
DAC 08
35 (82%)
290x
340 (75%)
>29x
7300 (60%)

LNCaP STEAP1+; PC3 STEAP1-

- Increasing drug loading notably improved degradation potency, especially for SMARCA4
- New linkage also confers improved degradation selectivity in antigen-low cell line
- Proliferation activity remained poor despite exceptional payload activity

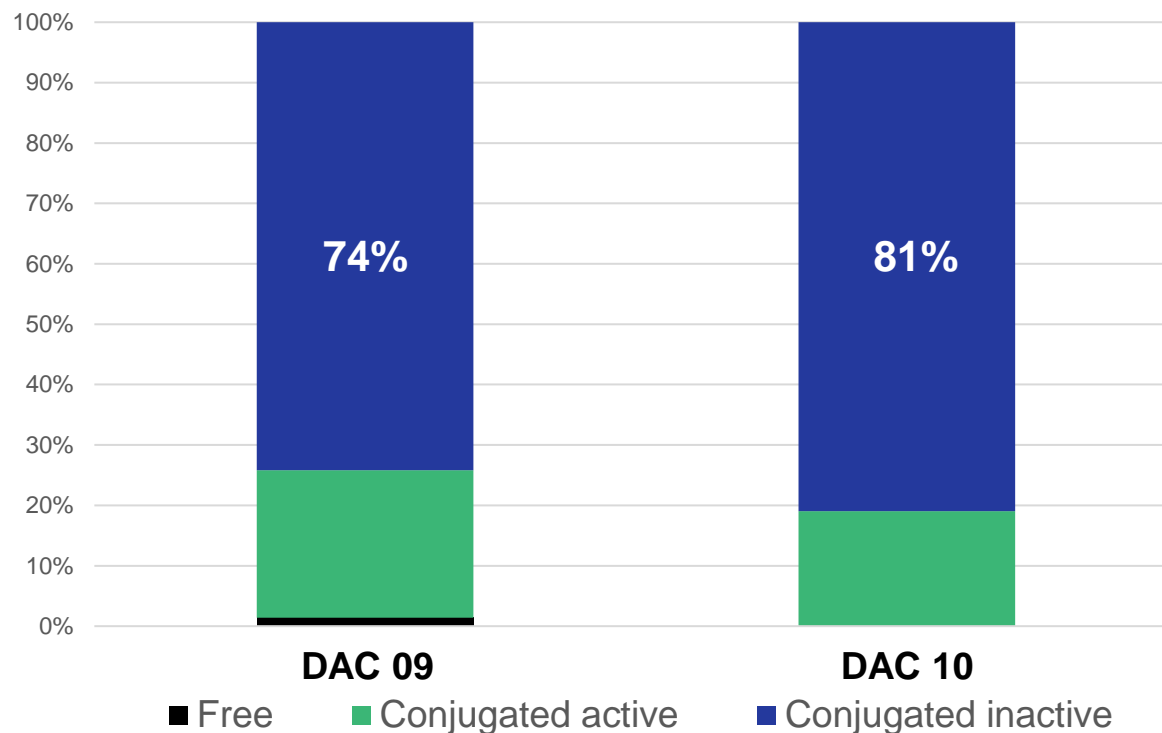
Degrader payload 6 demonstrates on-antibody hydrolysis in human plasma

Payload stability upon aging in plasma



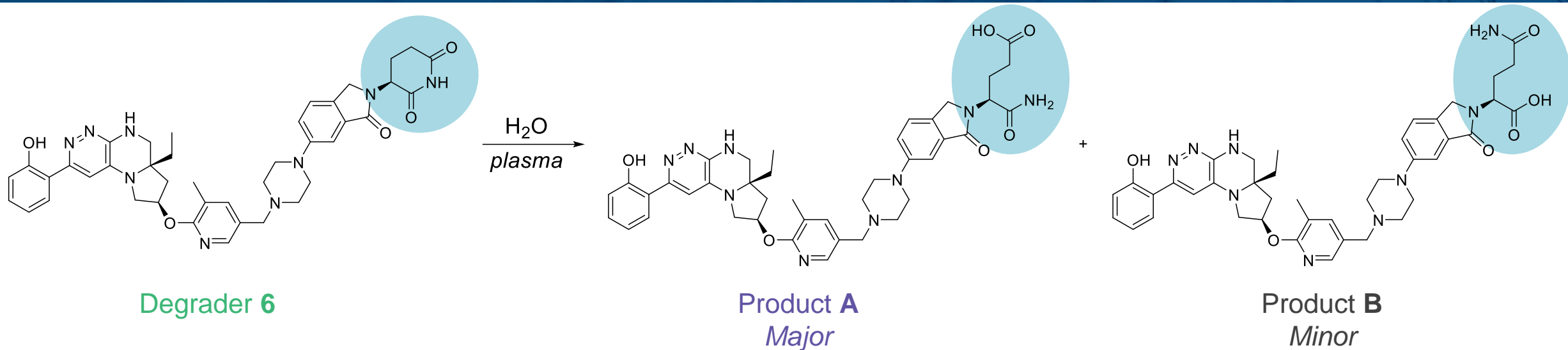
	6
hPlasma stability, $t_{1/2}$ (d)	1.4
mPlasma stability, $t_{1/2}$ (d)	1.4

Payload species upon aging pDAC in plasma (2 d)



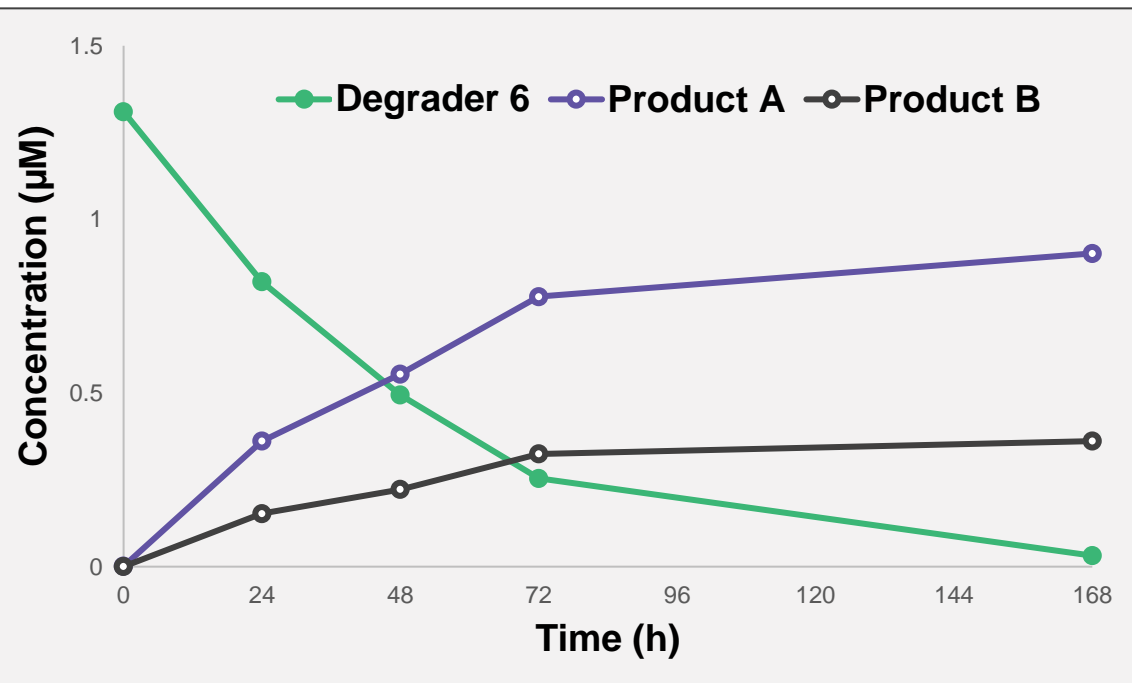
- In plasma, payload **6** hydrolyzes both alone as free drug and on-antibody as a conjugate
- Hydrolysis produces inactivated payload, which represents major conjugated species after just 2 d
- To advance more potent pDACs improved plasma stability proved essential

Mechanism of payload inactivation involves glutarimide hydrolysis



Product A
Major

Product B
Minor



- Two regioisomeric hydrolysis products observed in plasma
- Hydrolysis proceeds to near-quantitative conversion (7 d)
- Additional stability desired for pDAC payload

1) Schumacher, H.; et al. *Brit. J. Pharmacol.* **1965**, 25, 324.
2) Kumar, G.; et al. *Cancer Chemother. Pharmacol.* **2009**, 63, 1171.
3) Hoffman, M.; et al. *Cancer Chemother. Pharmacol.* **2013**, 71, 489.

Myth 2



Analogy MYTH

Good small molecules parameters translate to good payload qualities

Design of ADCs requires consideration of modality-specific features

Dosing

- Once monthly dosing
- $t_{1/2} \sim 7$ d

Storage

- Aqueous buffer
- Intentionally hemi-labile (cleavable)
- Shelf-life considerations

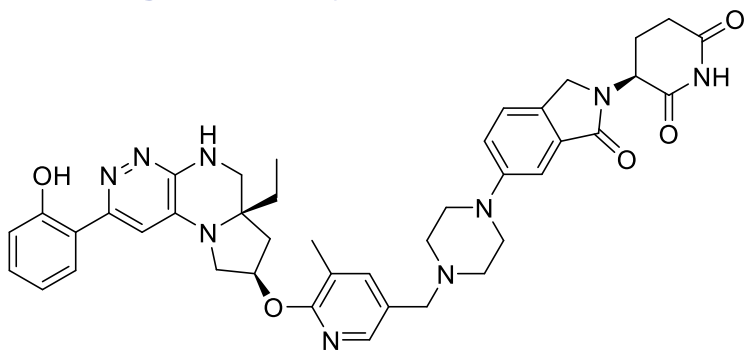
Composition

- Heterogeneous mixture
- Stochastic distribution of species



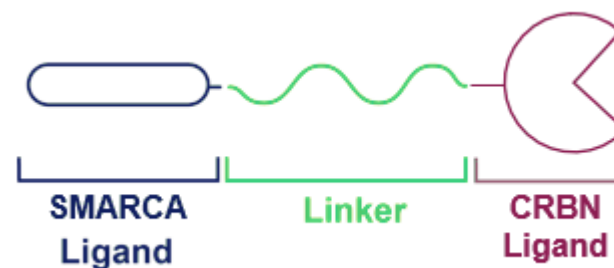
Medicinal chemistry approach extended payload stability in plasma

Initial CRBN-based degrader payload



Potency assays	6
HeLa HiBit SM2 DC ₅₀ (pM) (D _{max})	40 (97%)
HeLa HiBit SM4 DC ₅₀ (pM) (D _{max})	90 (97%)
Fold Selectivity SM4/SM2	2x
In vitro ADME	
hPlasma stability, t _{1/2} (d)	1.4

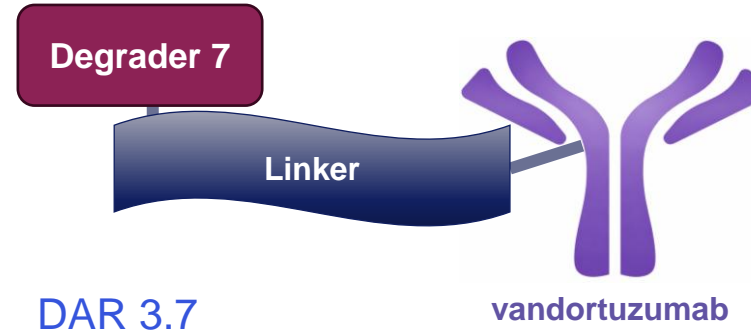
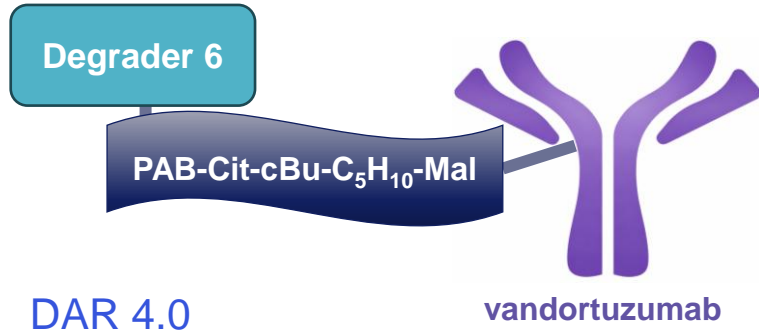
Plasma-stable CRBN-based degrader payload



7
26 (93%)
35 (96%)
1x
10

- Payload stability investigation informed additional degrader discovery campaign
- Focused on maintaining exceptional potency while limiting hydrolysis in plasma
- Identified degrader **7** with excellent potency and improved human plasma stability

More stable payload delivers more potent pDACs with desired activity profile



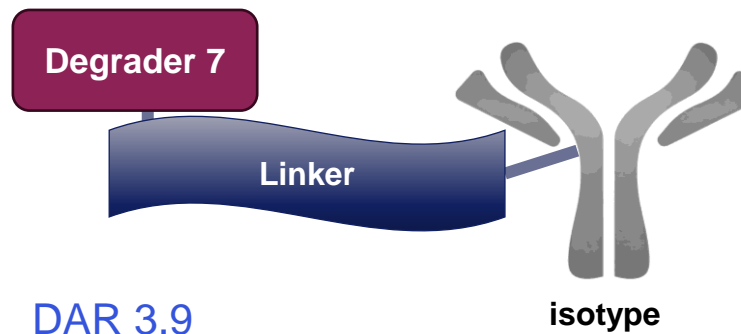
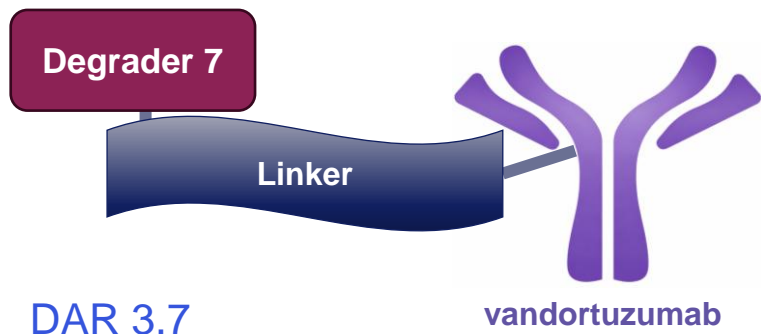
Potency (ng/mL)	DAC 08
LNCaP SM2 DC ₅₀ (D _{max})	35 (82%)
PC3 SM2 selectivity	290x
LNCaP SM4 DC ₅₀ (D _{max})	340 (75%)
PC3 SM4 selectivity	>29x
LNCaP prolifer EC ₅₀ (E _{max})	7300 (60%)

DAC 11
36 (89%)
150x
53 (80%)
160x
210 (82%)

LNCaP STEAP1+; PC3 STEAP1-

- Payload-linkers containing more stable degrader **7** conjugated to anti-STEAP1 antibody
- Resulting pDACs demonstrated superior SMARCA4 degradation and antiproliferative activity

Potent STEAP1 x SMARACA2/4 pDAC demonstrates antigen-selective activity



Potency (ng/mL)	DAC 11
LNCaP SM2 DC ₅₀ (D _{max})	36 (89%)
PC3 SM2 selectivity	150x
LNCaP SM4 DC ₅₀ (D _{max})	53 (80%)
PC3 SM4 selectivity	160x
LNCaP prolifer EC ₅₀ (E _{max})	210 (82%)

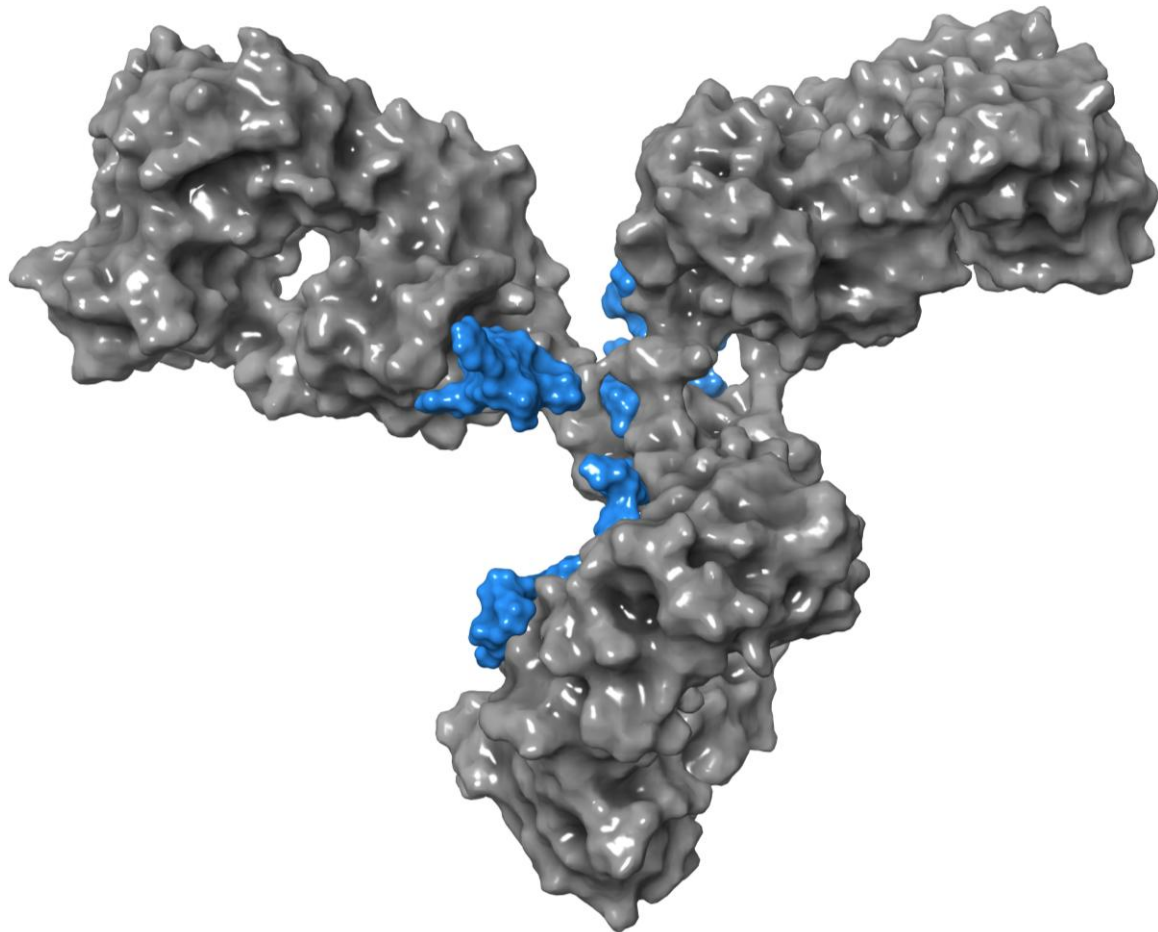
DAC 12
--
--
>1200 (14%)
n/a
>1200 (14%)

LNCaP STEAP1+; PC3 STEAP1-

- DAC 11 demonstrates exceptional antigen-selective activity
- Two-order of magnitude selectivity in antigen-negative PC3 cell lines
- Degradation and antiproliferation activity not observed for isotype control

Identification of STEAP1 x SMARCA2/4 pDACs highlights key design features

Model of precision DAC with Degradar 5 payload



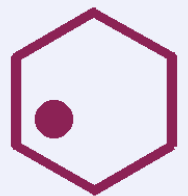
- Medicinal chemistry identified three potent, dual SMARCA2/4 degrader payloads
- Exceptional payload potency and long-term payload stability proved critical parameters
- Payload-linker composition and physicochemical properties affected pDAC developability and activity metrics
- Resulting pDACs demonstrated potent and antigen-selective activity in vitro

Case studies highlight nuances in extending SMARCA2/4 payloads to other antigens

Case Study 1



STEAP1
vandortuzumab



SMARCA2/4 degrader
Degrader 7



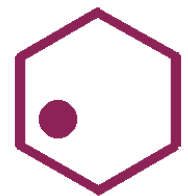
Good pDAC activity

Matched payload and antigen

Case Study 2



CEACAM5
tusamitamab



SMARCA2/4 degrader
Degrader 7



Poor pDAC activity

Same payload,
mismatched activity

Case Study 3



PSMA
rosopatamab



SMARCA2/4 degrader
Degrader 5



Good pDAC activity

Different antigen tolerates
less potent payload

Myth 3



Copy-and-Paste MYTH

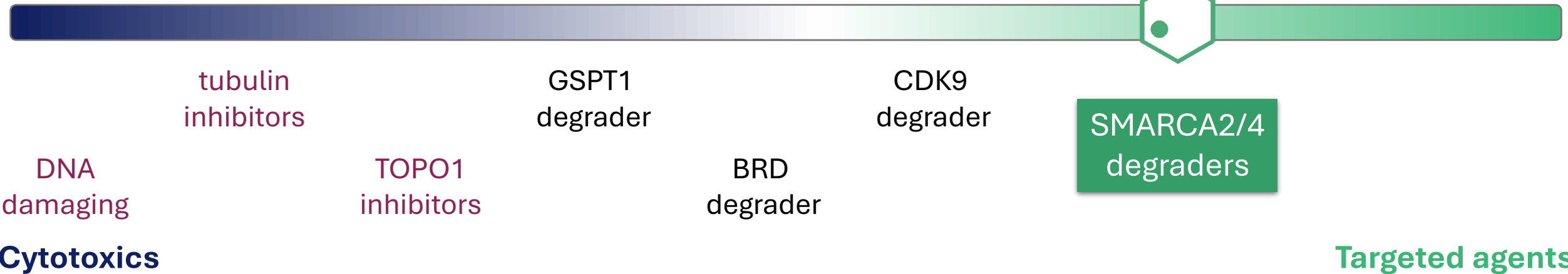
Payload-linkers work for any antigen target

Dialing in payload precision influences downstream ADC design and properties

General

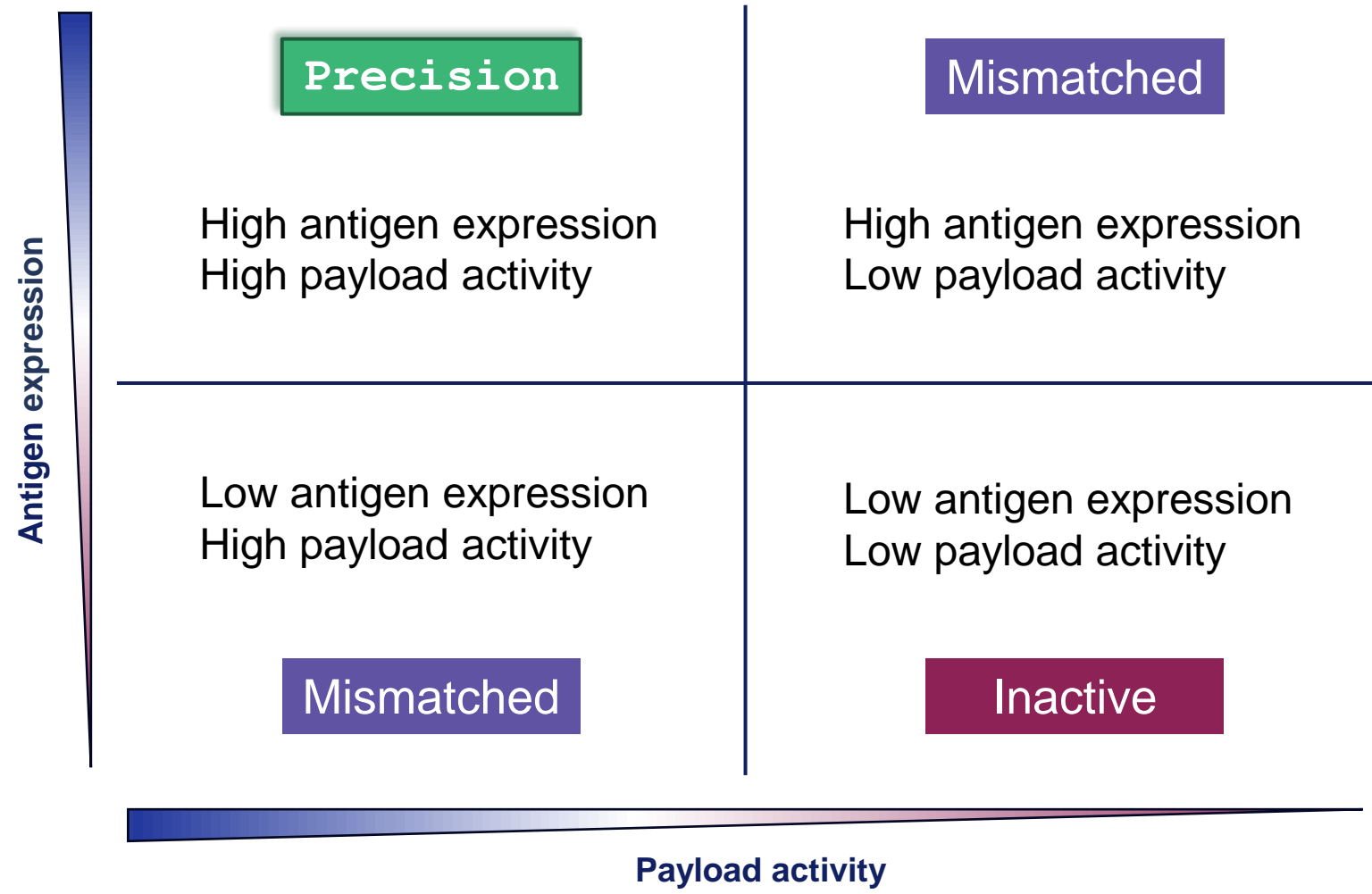


Precise



- Precision exists along spectrum from broad cytotoxics to highly indication-specific targeted agents
- Precision narrows application (generality) but offers potentially improved safety (therapeutic index)

Precision approach requires matching payload activity with antigen biology



Selection Criteria

- **Antigen biology**
 - Sufficient expression
 - Productive internalization
 - Disease context is key
- **Payload fit**
 - Intrinsic sensitivity to the payload mechanism of action
 - Degradation translation to antiproliferation/cytotoxicity
 - Cross-check against antigen expression

Case Study 2: Degradation to antiproliferative translation hinders CEACAM5 x SMARCA2/4 pDAC

Case Study 2 tusamitamab x Degradar 7



CEACAM5 antigen

High surface expression^a

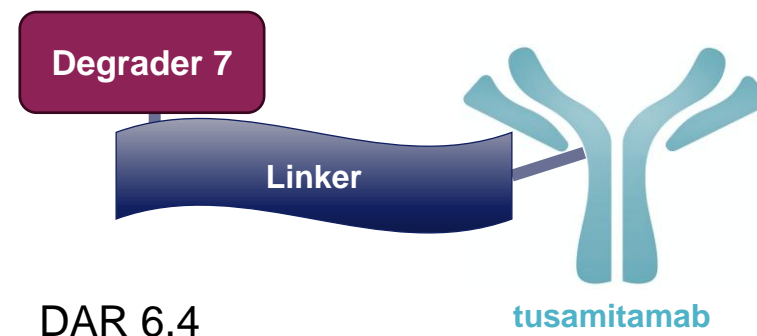
Antibody internalization confirmed



SMARCA2/4 degrader translation

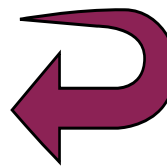
Degradar 7: No antiproliferative activity^b

Poor ADC antiproliferative activity



Cellular potency (ng/mL)	DAC 13
MKN45 SM2 DC ₅₀ (D _{max})	58 (77%)
MKN45 SM4 DC ₅₀ (D _{max})	44 (74%)
MKN45 proliferation EC ₅₀	>10000

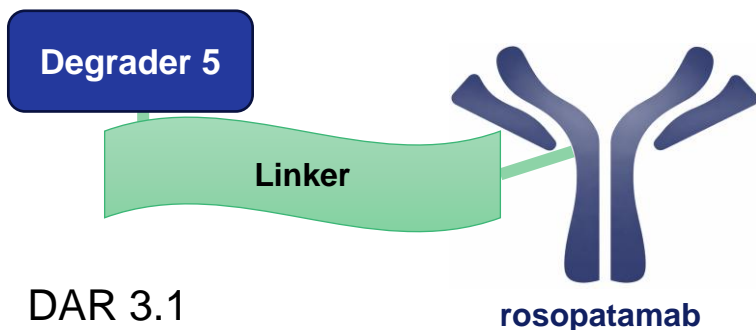
MKN45 CEACAM5+.



Same payload, mismatched activity

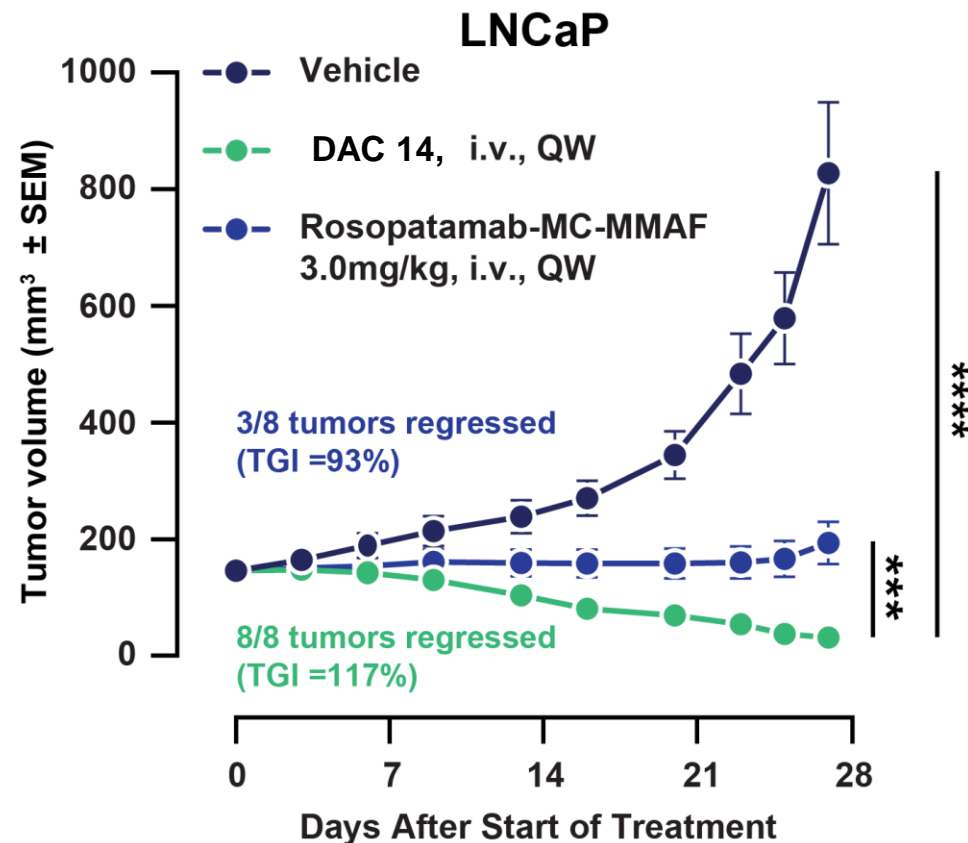
^aMKN45 cell line: surface receptor number >400k. ^bDegradation DC₅₀ < 1 nM; antiproliferation EC₅₀ >1000 nM.

Case Study 3: PSMA x SMARCA2/4 pDAC demonstrates regressions and exceeds cytotoxic ADC benchmark



Cellular potency (ng/mL)	DAC 14
LNCaP SM2 DC ₅₀ (D _{max})	6.9 (87%)
PC3 SM2 selectivity	32x
LNCaP SM4 DC ₅₀ (D _{max})	26 (90%)
PC3 SM4 selectivity	57x
LNCaP proliferation EC ₅₀ (E _{max})	57 (92%)

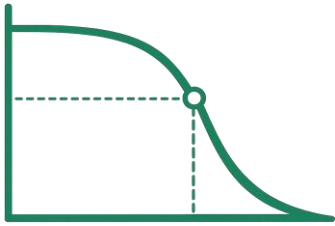
LNCaP PSMA+; PC3 PSMA-



- pDAC incorporating less potent degrader **5** demonstrates good potency and antigen-selective degradation
- Anti-proliferative activity of DAC **14** comparable to MMAF benchmark ADCs
- In vivo, DAC **14** induces regressions and exceeds efficacy of MMAF benchmark ADC

Identifying pDACs requires criteria that embrace the modality's complexities

Degrader payloads...



Must be highly potent
to achieve ADC activity

Picomolar potency



Should remain stable
in aqueous media & plasma

Stable for weeks



Require pairing
with right antigen target
for desired indication

Right combination matters

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Prelude
THERAPEUTICS