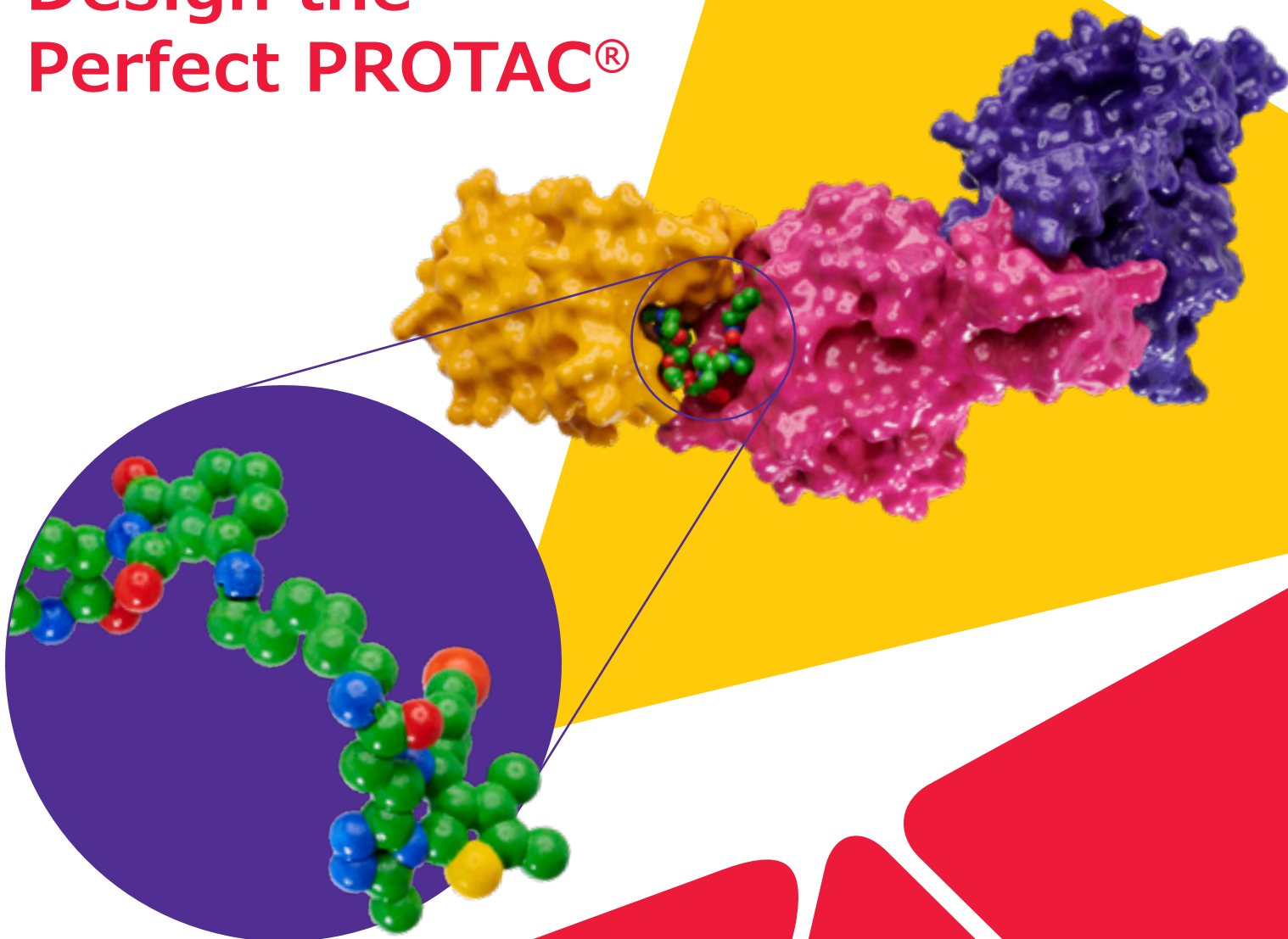


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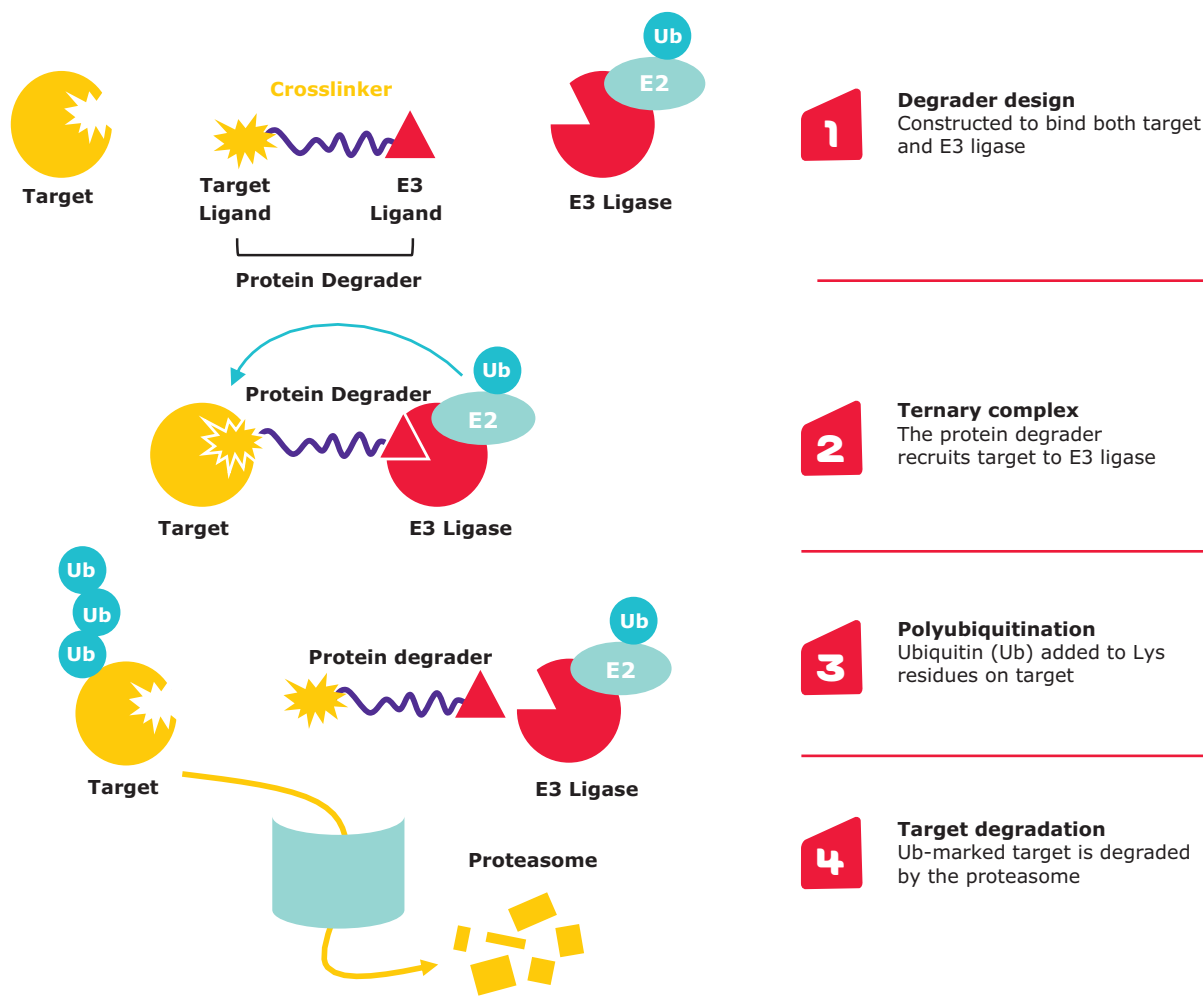
Targeted Protein Degradation

Targeted protein degradation is a novel strategy that uses small molecules to hijack endogenous proteolysis systems to degrade disease-relevant proteins. Reducing protein abundance in cells, phenotypes similar to gene-editing approaches (e.g. CRISPR-Cas9) can be achieved but with the advantages that come with small molecules. Not only is this of interest as a research tool to study the impact of selective protein knockdowns, but it has quickly been adopted by the global drug discovery community for its advantages over occupancy-based inhibition and drugging ~80% of proteins traditionally intractable to small molecules.

Agents used in these approaches are called protein degraders, such as proteolysis-targeting chimeras (PROTAC® degraders) or molecular glues.

Heterobifunctional protein degraders contain a target-binding warhead on one end and an E3 ubiquitin ligase-targeting ligand on the other, connected by a linker in the middle (Figure 1). When the degrader is applied, it recruits the target to the E3 ligase. Once in proximity of the E3 ligase, the target is polyubiquitinated, flagging it for degradation via the proteasome.¹⁻³

Figure 1. Targeted Protein Degradation with Heterobifunctional Degraders



Protein degrader discovery mirrors that of traditional small molecules; however, due to the degradation mechanism of action, there are unique considerations for researchers (Figure 2). As outlined in Nowak and Jones' four pillars for target validation, degraders must be carefully assessed for their structure-activity and pharmacokinetic–pharmacodynamic (PKPD) relationships.⁴



For researchers designing, synthesizing, and validating protein degraders, our suite of chemical and biological tools provide solutions along this workflow to empower molecule discovery and assay development.

Our full offer is summarized in this brochure.

Part 1: Protein Degradation Synthesis
page 4

Part 2: Target Validation
Page 17

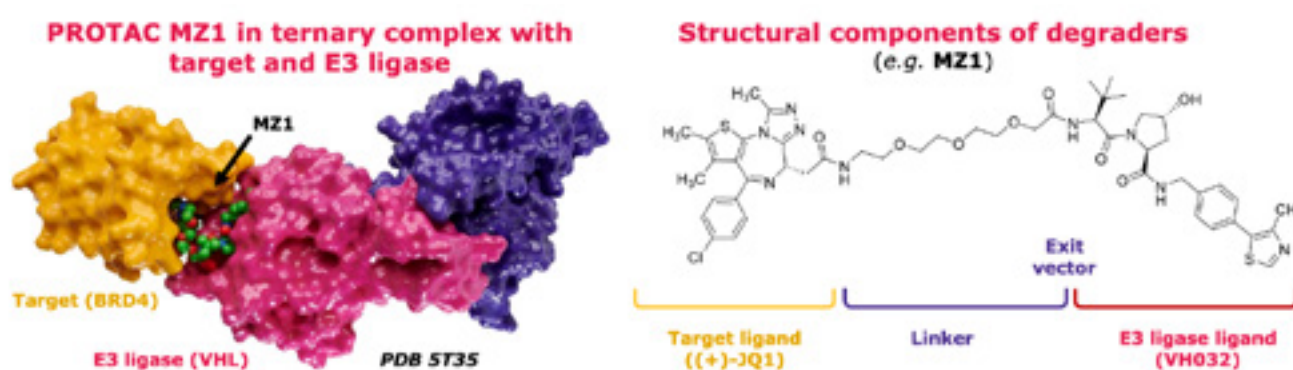
Part 1: Protein Degradation Synthesis

Challenges for Protein Degradation Synthesis

The design of degraders is challenging as slight alterations in structure can alter ternary complex formation and subsequent degradation.⁵ The 3D model in **Figure 3** based on PDB 5T35⁶ illustrates the importance of careful design to achieve binding to two disparate proteins (the target and E3 ligase) and the establishment

of a protein–protein interface. Even with advances in computational chemistry, degrader design is still largely an empirical process where researchers generate libraries of degraders, taking a modular approach to varying the ligands, linkers, and exit vectors, an intense upfront chemistry endeavor.^{5,7}

Figure 3. Degradation Ternary Complex and Structure



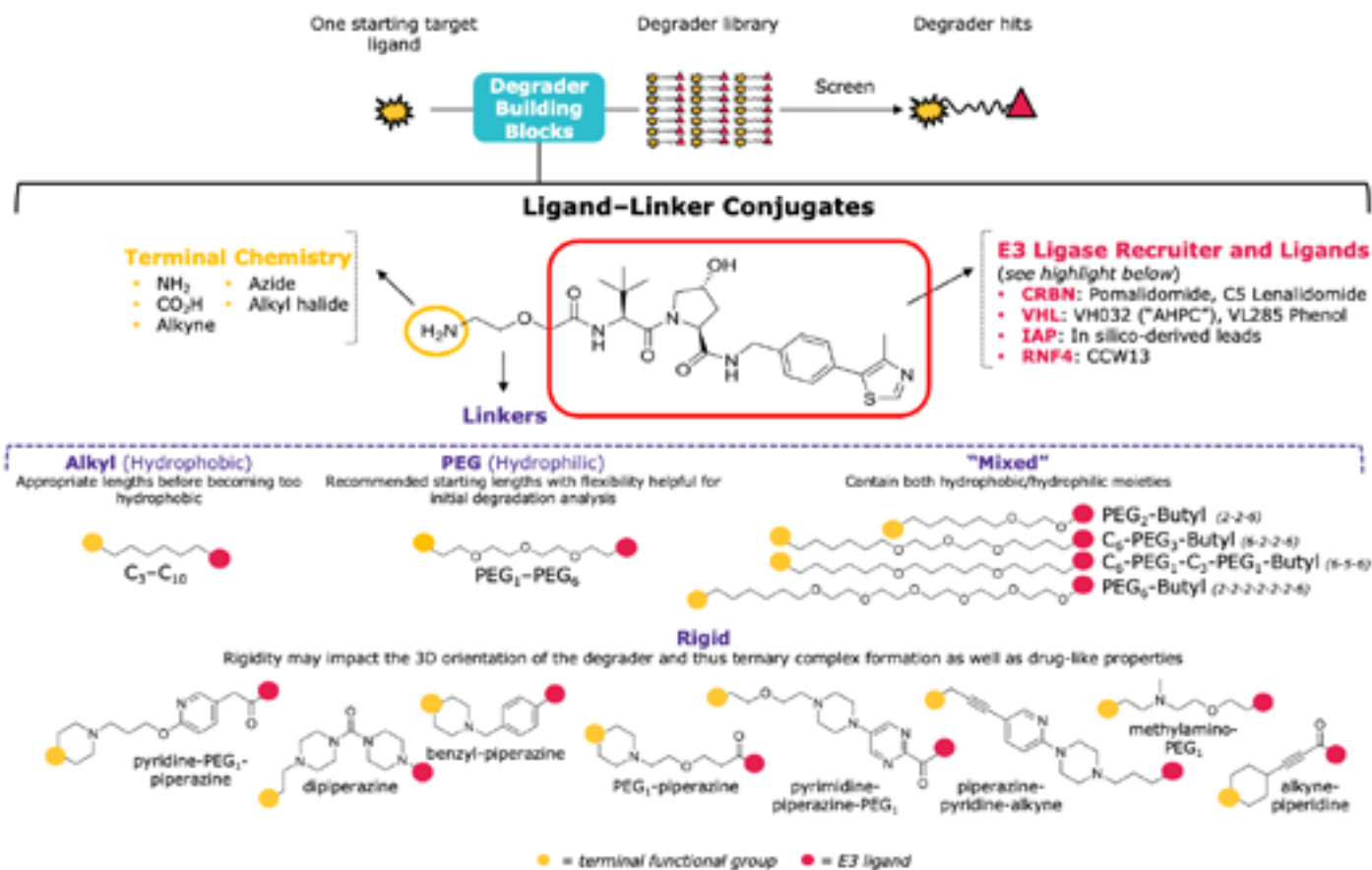
Streamlined Synthesis of Heterobifunctional Degradation Libraries

Our protein degradation building blocks are the easiest way to generate heterobifunctional degradation screening libraries from one starting target ligand to expedite degradation hit discovery. Within this building block collection that comprises all the components to construct degraders, our ligand–linker conjugates eliminate

upfront synthetic steps, requiring only the chemistry to link a target ligand on the terminal functional group (**Figure 4**). Moreover, if the same terminal chemistry is selected, a chemist can simultaneously react 50+ ligand–linker conjugates with one starting target ligand in parallel to generate an initial screening library.

Our protein degradation building blocks are the easiest way to generate heterobifunctional degradation screening libraries from one starting target ligand to expedite degradation hit discovery.

Figure 4. Ligand–Linker Conjugates



Diversity of the Ligand–Linker Conjugates

Our suite of ligand–linker conjugates contains strategic combinations of E3 ligands, exit vectors, linkers, and terminal chemistry.

- E3 Ligase Recruiters and Ligands:** While more E3 ligases are being researched for targeted protein degradation, a handful are used most often in the development of protein degraders.⁸ Our conjugates include ligands and varied exit vectors for the validated E3 ligases CRBN, VHL, IAP, and RNF4 (Figure 5).
- Linkers:** Alkyl and PEG linkers are excellent starters to sample a range of hydrophobicity, flexibility, and lengths. In addition, we offer many "mixed"⁹ and rigid¹⁰⁻¹³ linkers to achieve diverse linker properties in your library (Figure 4).
- Terminal Chemistry:** A variety of popular functional groups are available for linking the target warhead; our largest group includes terminal amines (Figure 4).

Advantages

Synthetic time-saver

Ligand-linker conjugates simplify synthesis of single degraders and parallel synthesis for library construction

Molecule design

Permutations of highest-interest E3 ligands, exit vectors, and linkers within the conjugates ease upfront combinatorial library design

Compatibility

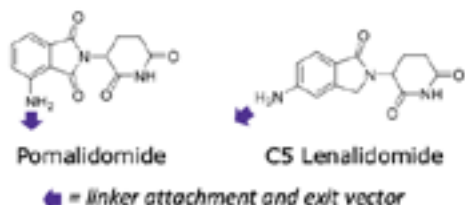
Linkers conjugate to common functional groups present on target ligands

SAR

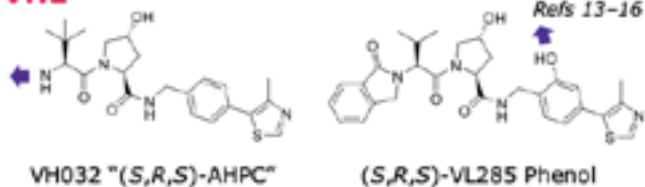
Strategic component variation built into the ligand-linker conjugates provides an upfront glimpse at SAR for informed optimization

Figure 5. E3 Ligase Ligands Featured in Conjugates

CRBN

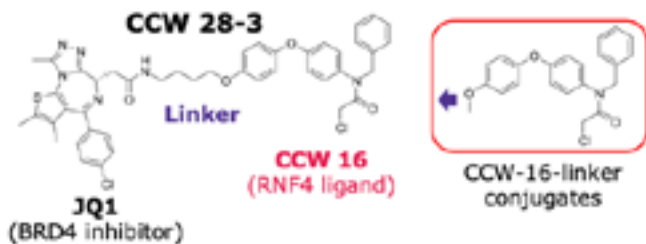


VHL



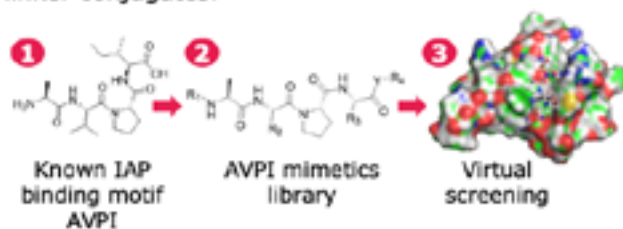
RNF4

Based on the CCW-16 covalent ligand demonstrated to be useful in a BRD4 degrader, eight CCW-16-linker conjugates were developed in partnership with ComInnex.

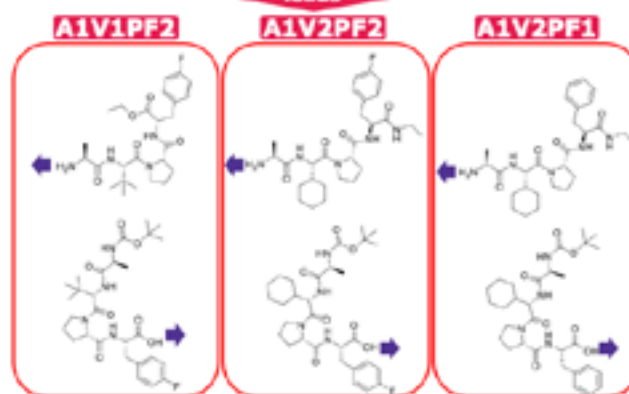


IAP

In partnership with ComInnex, three novel, in silico-derived IAP leads were developed into 24 lead-linker conjugates.



Top three in silico-derived IAP leads



Each lead ligand was conjugated at the N- or C-terminus with C₆, C₁₀, PEG₁, and PEG₂ linkers

ComInnex

Let us help you

build your degrader library based on what is most important to you.

Reach out to your Sigma-Aldrich technical specialist or [SigmaAldrich.com/techservice](https://www.sigmaaldrich.com/techservice) for a sortable list and structure data file of all synthesis products, including 150+ ligand-linker conjugates, 250+ heterobifunctional linkers, 20+ ligands, and related probe compounds.

[SigmaAldrich.com/TargetDegradation](https://www.sigmaaldrich.com/TargetDegradation)

Pomalidomide Ligand-Linker Conjugates for CRBN-Mediated Degradation Synthesis

Cat. No.	Product Name	Cat. No.	Product Name
901523	Pomalidomide-PEG ₁ -Alkyne	923885	Pomalidomide-Piperazine-Piperidine-4-Carboxamide HCl
901529	Pomalidomide-PEG ₂ -Alkyne	916536	Pomalidomide-Piperazine-Pyridine-Alkyne-NH ₂ HCl
901531	Pomalidomide-PEG ₃ -Alkyne	920789	Pomalidomide-Pyridine-PEG ₁ -Piperazine HCl
901833	Pomalidomide-PEG ₄ -Alkyne	903825	Pomalidomide-PEG ₁ -Azide
901834	Pomalidomide-PEG ₅ -Alkyne	903833	Pomalidomide-PEG ₂ -Azide
901835	Pomalidomide-PEG ₆ -Alkyne	904678	Pomalidomide-PEG ₃ -Azide
910619	Pomalidomide-PEG ₆ -Butyl Alkyne	909386	Pomalidomide-PEG ₄ -Azide
910503	Pomalidomide-PEG ₂ -Butyl Alkyne	909394	Pomalidomide-PEG ₅ -Azide
910511	Pomalidomide-C ₆ -PEG ₃ -Butyl Alkyne	909408	Pomalidomide-PEG ₆ -Azide
911658	Pomalidomide-C ₃ -NH ₂ HCl	903434	Pomalidomide-PEG ₆ -Butyl Azide
911666	Pomalidomide-C ₆ -NH ₂ HCl	904872	Pomalidomide-PEG ₂ -Butyl Azide
920738	Pomalidomide-C ₉ -NH ₂ HCl	904686	Pomalidomide-C ₆ -PEG ₃ -Butyl Azide
901516	Pomalidomide-PEG ₁ -NH ₂ HCl *SYNPLE-P001	904880	Pomalidomide-C ₆ -PEG ₁ -C ₃ -PEG ₁ -Butyl Azide
901513	Pomalidomide-PEG ₂ -NH ₂ HCl *SYNPLE-P002	901527	Pomalidomide-PEG ₁ -CO ₂ H
901495	Pomalidomide-PEG ₃ -NH ₂ HCl *SYNPLE-P003	901526	Pomalidomide-PEG ₂ -CO ₂ H
901830	Pomalidomide-PEG ₄ -NH ₂ HCl *SYNPLE-P004	901504	Pomalidomide-PEG ₃ -CO ₂ H
901831	Pomalidomide-PEG ₅ -NH ₂ HCl *SYNPLE-P005	901824	Pomalidomide-PEG ₄ -CO ₂ H
901832	Pomalidomide-PEG ₆ -NH ₂ HCl	901828	Pomalidomide-PEG ₅ -CO ₂ H
905224	Pomalidomide-PEG ₆ -Butyl Amine HCl	901829	Pomalidomide-PEG ₆ -CO ₂ H
911003	Pomalidomide-PEG ₂ -Butyl Amine HCl	910481	Pomalidomide-PEG ₆ -Butyl CO ₂ H
911682	Pomalidomide-PEG ₁ -Piperazine HCl	910449	Pomalidomide-PEG ₂ -Butyl CO ₂ H
921319	Pomalidomide-methylamino-PEG ₁ -NH ₂ hydrochloride	901500	Pomalidomide-C ₃ -CO ₂ H
923931	Pomalidomide-4-Piperidine-C ₁ -Piperazine HCl	901496	Pomalidomide-C ₆ -CO ₂ H
923958	6F,C ₅ -Pomalidomide-4-Piperidine-C ₁ -Piperazine HCl	901525	Pomalidomide-C ₉ -CO ₂ H
905208	Pomalidomide-C ₆ -PEG ₃ -Butyl Amine HCl	903442	Pomalidomide-PEG ₆ -Butyl Iodide
913987	Pomalidomide-C ₆ -PEG ₁ -C ₃ -PEG ₁ -Butyl Amine HCl	904724	Pomalidomide-PEG ₂ -Butyl Iodide
920746	Pomalidomide-Benzyl-Piperazine HCl	904708	Pomalidomide-C ₆ -PEG ₃ -Butyl Iodide
915572	Pomalidomide-Dipiperazine-NH ₂ HCl	906050	Pomalidomide-C ₆ -PEG ₁ -C ₃ -PEG ₁ -Butyl Iodide
923877	Pomalidomide-Piperazine-C ₁ -4-Piperidine HCl		

*Also available as automated synthesis cartridge with indicated catalog number

C5 Lenalidomide Ligand-Linker Conjugates for CRBN-Mediated Degradation Synthesis

Cat. No.	Product Name	Cat. No.	Product Name
911704	C5 Lenalidomide-C ₃ -NH ₂ HCl	917303	C5 Lenalidomide-C ₆ -PEG ₁ -C ₃ -PEG ₁ -Butyl NH ₂ HCl
911712	C5 Lenalidomide-C ₆ -NH ₂ HCl	918350	C5 Lenalidomide-Alkyne-Piperidine HCl
911720	C5 Lenalidomide-C ₉ -NH ₂ HCl	920754	C5 Lenalidomide-Benzyl-Biperazine HCl
911739	C5 Lenalidomide-PEG ₁ -NH ₂ HCl	919896	C5 Lenalidomide-Benzyl-Piperazine HCl
911747	C5 Lenalidomide-PEG ₃ -NH ₂ HCl	911763	C5 Lenalidomide-PEG ₁ -Piperazine HCl
911755	C5 Lenalidomide-PEG ₅ -NH ₂ HCl	917729	C5 Lenalidomide-Piperazine-Pyridine-Alkyne-NH ₂ HCl
920800	C5 Lenalidomide-Methylamino-PEG ₁ -NH ₂ HCl	920797	C5 Lenalidomide-Pyridine-PEG ₁ -Piperazine HCl
921327	C5 Lenalidomide-PEG ₆ -Butyl NH ₂ HCl	921300	C5 Lenalidomide-Pyrimidine-Piperazine-PEG ₁ -NH ₂ HCl
919969	C5 Lenalidomide-PEG ₂ -Butyl NH ₂ HCl		

CRBN Ligand-Linker Conjugates for Photoswitchable Degradation Synthesis

Cat. No.	Product Name	Cat. No.	Product Name
918091	Lenalidomide-Photoswitch2-NH ₂ HCl	919888	Thalidomide-Photoswitch3-NH ₂ HCl
911771	Lenalidomide-Photoswitch1-NH ₂ hydrochloride		

VH032 Ligand-Linker Conjugates for VHL-Mediated Degradation Synthesis

Cat. No.	Product Name	Cat. No.	Product Name
901503	(S,R,S)-AHPC-PEG ₁ -Alkyne	920762	(S,R,S)-AHPC-Benzyl-Piperazine HCl
901517	(S,R,S)-AHPC-PEG ₂ -Alkyne	920606	(S,R,S)-AHPC-Piperazine-Pyridine-Alkyne-NH ₂ HCl
901533	(S,R,S)-AHPC-PEG ₃ -Alkyne	920835	(S,R,S)-VL285 Phenol-piperazine-pyridine-alkyne-NH ₂ hydrochloride
901851	(S,R,S)-AHPC-PEG ₄ -Alkyne	921432	(S,R,S)-AHPC-Pyridine-PEG ₁ -Piperazine HCl
901855	(S,R,S)-AHPC-PEG ₅ -Alkyne	921939	(S,R,S)-AHPC-Pyrimidine-Piperazine-PEG ₁ -NH ₂ HCl
901873	(S,R,S)-AHPC-PEG ₆ -Alkyne	919357	(S,R,S)-AHPC-PEG ₁ -Piperazine HCl
910597	(S,R,S)-AHPC-PEG ₆ -Butyl Alkyne	903957	(S,R,S)-AHPC-PEG ₁ -Azide
910538	(S,R,S)-AHPC-PEG ₂ -Butyl Alkyne	904813	(S,R,S)-AHPC-PEG ₂ -Azide
910546	(S,R,S)-AHPC-C ₆ -PEG ₃ -Butyl Alkyne	904651	(S,R,S)-AHPC-PEG ₃ -Azide
917052	(S,R,S)-AHPC-C ₃ -NH ₂ HCl	909262	(S,R,S)-AHPC-PEG ₄ -Azide
917559	(S,R,S)-AHPC-C ₆ -NH ₂ HCl	909351	(S,R,S)-AHPC-PEG ₅ -Azide
917818	(S,R,S)-AHPC-C ₉ -NH ₂ HCl	909378	(S,R,S)-AHPC-PEG ₆ -Azide
901493	(S,R,S)-AHPC-PEG ₁ -NH ₂ HCl *SYNPLE-P006	904864	(S,R,S)-AHPC-PEG ₆ -Butyl Azide
901488	(S,R,S)-AHPC-PEG ₂ -NH ₂ HCl *SYNPLE-P007	905216	(S,R,S)-AHPC-PEG ₂ -Butyl Azide
901511	(S,R,S)-AHPC-PEG ₃ -NH ₂ HCl *SYNPLE-P008	904821	(S,R,S)-AHPC-C ₆ -PEG ₃ -Butyl Azide
901848	(S,R,S)-AHPC-PEG ₄ -NH ₂ HCl *SYNPLE-P009	905178	(S,R,S)-AHPC-C ₆ -PEG ₁ -C ₃ -PEG ₁ -Butyl Azide
901850	(S,R,S)-AHPC-PEG ₅ -NH ₂ HCl *SYNPLE-P010	901534	(S,R,S)-AHPC-C ₆ -CO ₂ H HCl
901860	(S,R,S)-AHPC-PEG ₆ -NH ₂ HCl	910554	(S,R,S)-AHPC-PEG ₆ -Butyl CO ₂ H
920827	(S,R,S)-AHPC-Methylamino-PEG ₁ -NH ₂ HCl	910600	(S,R,S)-AHPC-PEG ₂ -Butyl CO ₂ H
905275	(S,R,S)-AHPC-PEG ₆ -Butyl Amine HCl	907677	(S,R,S)-AHPC-PEG ₆ -Butyl Chloride
906123	(S,R,S)-AHPC-PEG ₂ -Butyl Amine HCl	905399	(S,R,S)-AHPC-PEG ₂ -Butyl Chloride
905232	(S,R,S)-AHPC-C ₆ -PEG ₃ -Butyl Amine HCl	905380	(S,R,S)-AHPC-C ₆ -PEG ₃ -Butyl Chloride
911801	(S,R,S)-AHPC-C ₆ -PEG ₁ -C ₃ -PEG ₁ -Butyl Amine HCl	905402	(S,R,S)-AHPC-C ₆ -PEG ₁ -C ₃ -PEG ₁ -Butyl Chloride
918687	(S,R,S)-AHPC-Alkyne-Piperidine HCl		

*Also available as automated synthesis cartridge with indicated catalog number

VL285 Phenol Ligand-Linker Conjugates for VHL-Mediated Degradation Synthesis

Cat. No.	Product Name	Cat. No.	Product Name
920851	(S,R,S)-VL285 Phenol-C ₂ -NH ₂ HCl	922161	(S,R,S)-VL285 Phenol-Methylamino-PEG ₁ -NH ₂ HCl
920878	(S,R,S)-VL285 Phenol-C ₆ -NH ₂ HCl	922153	(S,R,S)-VL285 Phenol-C ₃ -Piperazine HCl
920894	(S,R,S)-VL285 Phenol-PEG ₂ -NH ₂ HCl	920843	(S,R,S)-VL285 Phenol-PEG ₁ -Piperazine HCl
920886	(S,R,S)-VL285 Phenol-PEG ₄ -NH ₂ HCl	925039	E7820-PEG3-NH2 hydrochloride

In silico-Derived AVP Ligands and Linker Conjugates for IAP-Mediated Degradation Synthesis

Learn more at [SigmaAldrich.com/IAP-degrader-BBs](https://sigmaaldrich.com/IAP-degrader-BBs)

Cat. No.	Product Name	Cat. No.	Product Name
917710	A1V1PF2-OEt	917478	BocA1V1PF2
917427	A1V1PF2-OEt-C ₆ -NH ₂ HCl	916927	BocA1V1PF2-OC ₆ -NH ₂ HCl
917672	A1V1PF2-OEt-C ₁₀ -NH ₂ HCl	917184	BocA1V1PF2-OC ₁₀ -NH ₂ HCl
917923	A1V1PF2-OEt-PEG ₁ -NH ₂ HCl	917435	BocA1V1PF2-OPEG ₁ -NH ₂ HCl
916676	A1V1PF2-OEt-PEG ₃ -NH ₂ HCl	917680	BocA1V1PF2-OPEG ₃ -NH ₂ HCl
917222	A1V2PF1-NHEt	916978	BocA1V2PF1
916943	A1V2PF1-NHEt-C ₆ -NH ₂	917966	BocA1V2PF1-NHC ₆ -NH ₂
917206	A1V2PF1-NHEt-C ₁₀ -NH ₂	916706	BocA1V2PF1-NHC ₁₀ -NH ₂
917451	A1V2PF1-NHEt-PEG ₁ -NH ₂	916951	BocA1V2PF1-NHPEG ₁ -NH ₂
917702	A1V2PF1-NHEt-PEG ₃ -NH ₂	917214	BocA1V2PF1-NHPEG ₃ -NH ₂
916714	A1V2PF2-NHEt	917974	BocA1V2PF2
917931	A1V2PF2-NHEt-C ₆ -NH ₂	917443	BocA1V2PF2-NHC ₆ -NH ₂
916684	A1V2PF2-NHEt-C ₁₀ -NH ₂	917699	BocA1V2PF2-NHC ₁₀ -NH ₂
916935	A1V2PF2-NHEt-PEG ₁ -NH ₂	917958	BocA1V2PF2-NHPEG ₁ -NH ₂
917192	A1V2PF2-NHEt-PEG ₃ -NH ₂	916692	BocA1V2PF2-NHPEG ₃ -NH ₂
		CIX001	ComInnex IAP Ligand Library

CCW16 Ligand-Linker Conjugates for RNF4-Mediated Degradation Synthesis

Learn more at SigmaAldrich.com/RNF4-degrader-BBs

Cat. No.	Product Name	Cat. No.	Product Name
919403	CCW16-C ₄ -BocNH	919454	CCW16-PEG ₃ -BocNH
919411	CCW16-C ₆ -BocNH	919462	CCW16-PEG ₅ -BocNH
919438	CCW16-C ₉ -BocNH	919470	CCW16-PEG ₂ -Butyl-BocNH
919446	CCW16-PEG ₁ -BocNH	919489	CCW16-C ₆ -PEG ₃ -Butyl-BocNH

Automated Degradation Synthesis

Synple 2 Automated Synthesizer is a benchtop, capsule-based, easy-to-use automated synthesis device. Excitingly, PEGylated, amine-terminated ligand-linker conjugates are now available as reagent cartridges for use with the automated synthesizer.



Simply add the disposable cartridge along with your target-specific ligand. With the touch of a button, the product is generated, isolated, and purified.²⁰

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Cat. No.	Product Name	Non-Cartridge Product
SYNPLE-SC002	Synple 2 Automated Synthesizer	
SYNPLE-P001	Reagent-cartridge CRBN-PEG ₁	901516
SYNPLE-P002	Reagent-cartridge CRBN-PEG ₂	901513
SYNPLE-P003	Reagent-cartridge CRBN-PEG ₃	901495
SYNPLE-P004	Reagent-cartridge CRBN-PEG ₄	901830
SYNPLE-P005	Reagent-cartridge CRBN-PEG ₅	901831
SYNPLE-P021	Reagent-cartridge VHL-PEG ₁	901493
SYNPLE-P022	Reagent-cartridge VHL-PEG ₂	901488
SYNPLE-P023	Reagent-cartridge VHL-PEG ₃	901511
SYNPLE-P024	Reagent-cartridge VHL-PEG ₄	901848
SYNPLE-P025	Reagent-cartridge VHL-PEG ₅	901850

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Cat. No.	Product Name
DYNA001	DyNABind® DNA-Encoded Fragment Library
DYNA002	DyNABind® 10 Million Compound DNA-Encoded Library



Related Protein Degradation Discovery Tools

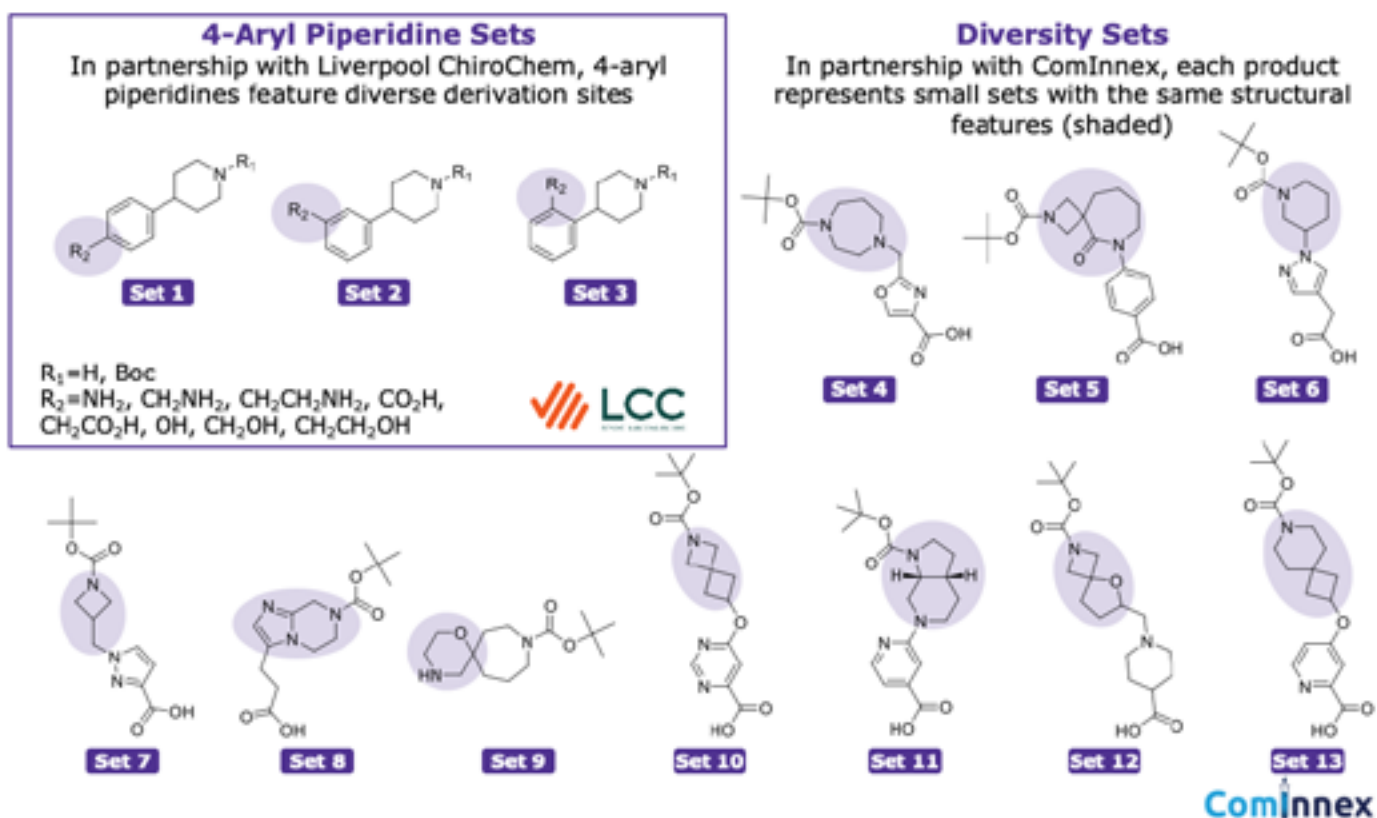
Cat. No.	Product Name	Cat. No.	Product Name
913979	Biotin-Thalidomide	914738	KB02-SLF Electrophilic Protein Degradation
909416	Fluorinated VHL Spy Molecule 1	914975	KB03-SLF Electrophilic Protein Degradation
909432	Fluorinated VHL Spy Molecule 2	913715	KB05-SLF Electrophilic Protein Degradation
909440	Fluorinated VHL Spy Molecule 3	914223	Biotin-SLF
909459	Fluorinated VHL Spy Molecule 4		

Rigid Linkers

Rigidity is increasingly of interest for optimization of bifunctional degraders as it may impact drug-like properties as well as the 3D orientation of the degrader and thus ternary complex formation.¹⁰⁻¹³ We offer many new rigid linkers that are not included as conjugates but rather as the heterobifunctional linkers with

differentiated chemistry on either end for linkage to E3 and target ligands. To aid SAR, they are organized into 4-aryl piperidine sets based on derivation sites or diversity sets based on similar structural features (Figure 6).

Figure 6. Rigid Linker Sets



Rigid Heterobifunctional Linkers: 4-Aryl Piperidine Sets

Set	Cat. No.	Product Name	End 1	End 2
1	916889	tert-Butyl 4-(4-(2-aminoethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Amine
1	917354	tert-Butyl 4-(4-(aminomethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Amine
1	916870	4-(1-(tert-Butoxycarbonyl)piperidin-4-yl)benzoic acid	Boc-piperidine	Carboxylic acid
1	917362	2-(4-(1-(tert-Butoxycarbonyl)piperidin-4-yl)phenyl)acetic acid	Boc-piperidine	Carboxylic acid
1	916595	tert-Butyl 4-(4-(2-hydroxyethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Hydroxyl
1	917125	tert-Butyl 4-(4-(hydroxymethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Hydroxyl
1	917133	(4-(Piperidin-4-yl)phenyl)methanamine dihydrochloride	Piperidine	Amine
1	917907	2-(4-(Piperidin-4-yl)phenyl)ethan-1-amine dihydrochloride	Piperidine	Amine
1	917095	4-(Piperidin-4-yl)benzoic acid hydrochloride	Piperidine	Carboxylic acid
1	917605	2-(4-(Piperidin-4-yl)phenyl)acetic acid hydrochloride	Piperidine	Carboxylic acid
1	917141	2-(4-(Piperidin-4-yl)phenyl)ethan-1-ol hydrochloride	Piperidine	Hydroxyl
1	917648	(4-(Piperidin-4-yl)phenyl)methanol hydrochloride	Piperidine	Hydroxyl
2	916625	tert-Butyl 4-(3-(2-aminoethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Amine

Rigid Heterobifunctional Linkers: 4-Aryl Piperidine Sets - Continued

Set	Cat. No.	Product Name	End 1	End 2
2	916587	3-(1-(tert-Butoxycarbonyl)piperidin-4-yl)benzoic acid	Boc-piperidine	Carboxylic acid
2	917109	2-(3-(1-(tert-Butoxycarbonyl)piperidin-4-yl)phenyl)acetic acid	Boc-piperidine	Carboxylic acid
2	917400	tert-Butyl 4-(3-(2-hydroxymethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Hydroxyl
2	917591	tert-Butyl 4-(3-(2-hydroxyethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Hydroxyl
2	916633	(3-(Piperidin-4-yl)phenyl)methanamine dihydrochloride	Piperidine	Amine
2	916641	2-(3-(Piperidin-4-yl)phenyl)ethan-1-amine dihydrochloride	Piperidine	Amine
2	916617	2-(3-(Piperidin-4-yl)phenyl)acetic acid hydrochloride	Piperidine	Carboxylic acid
2	917656	3-(Piperidin-4-yl)benzoic acid hydrochloride	Piperidine	Carboxylic acid
2	916897	(3-(Piperidin-4-yl)phenyl)methanol hydrochloride	Piperidine	Hydroxyl
2	916900	2-(3-(Piperidin-4-yl)phenyl)ethan-1-ol hydrochloride	Piperidine	Hydroxyl
3	916846	2-(1-(tert-Butoxycarbonyl)piperidin-4-yl)benzoic acid	Boc-piperidine	Carboxylic acid
3	917915	2-(2-(1-(tert-Butoxycarbonyl)piperidin-4-yl)phenyl)acetic acid	Boc-piperidine	Carboxylic acid
3	917168	tert-Butyl 4-(2-(hydroxymethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Hydroxyl
3	917850	tert-Butyl 4-(2-(2-hydroxyethyl)phenyl)piperidine-1-carboxylate	Boc-piperidine	Hydroxyl
3	917397	(2-(Piperidin-4-yl)phenyl)methanamine dihydrochloride	Piperidine	Amine
3	917419	2-(2-(Piperidin-4-yl)phenyl)ethan-1-amine dihydrochloride	Piperidine	Amine
3	916854	2-(Piperidin-4-yl)benzoic acid hydrochloride	Piperidine	Carboxylic acid
3	917869	2-(2-(Piperidin-4-yl)phenyl)acetic acid hydrochloride	Piperidine	Carboxylic acid
3	917664	2-(2-(Piperidin-4-yl)phenyl)ethan-1-ol hydrochloride	Piperidine	Hydroxyl
3	917893	(2-(Piperidin-4-yl)phenyl)methanol hydrochloride	Piperidine	Hydroxyl

Rigid Heterobifunctional Linkers: Diversity Sets

Set	Cat. No.	Product Name	End 1	End 2
4	920525	2-((4-(tert-Butoxycarbonyl)-1,4-diazepan-1-yl)methyl)oxazole-4-carboxylic acid	Boc-diazepane	Carboxylic acid
4	920517	6-(4-(tert-Butoxycarbonyl)-1,4-diazepan-1-yl)pyrazine-2-carboxylic acid	Boc-diazepane	Carboxylic acid
4	920681	2-(3-(4-(tert-Butoxycarbonyl)-1,4-diazepan-1-yl)pyrazin-2-yl)acetic acid	Boc-diazepane	Carboxylic acid
5	920592	2-(2-(tert-Butoxycarbonyl)-5-oxo-2,6-diazaspiro[3.6]decan-6-yl)benzoic acid	Boc-azetidine	Carboxylic acid
5	920614	4-(2-(tert-Butoxycarbonyl)-5-oxo-2,6-diazaspiro[3.6]decan-6-yl)benzoic acid	Boc-azetidine	Carboxylic acid
5	920622	4-(2-(tert-Butoxycarbonyl)-5-oxo-2,6-diazaspiro[3.6]decan-6-yl)picolinic acid	Boc-azetidine	Carboxylic acid
5	920630	5-(2-(tert-Butoxycarbonyl)-5-oxo-2,6-diazaspiro[3.6]decan-6-yl)picolinic acid	Boc-azetidine	Carboxylic acid
5	920711	3-(2-(tert-Butoxycarbonyl)-5-oxo-2,6-diazaspiro[3.6]decan-6-yl)benzoic acid	Boc-azetidine	Carboxylic acid
6	920533	2-(2-((1-(tert-Butoxycarbonyl)piperidin-4-yl)methyl)-1H-imidazo-1-yl)acetic acid	Boc-piperidine	Carboxylic acid
6	920649	1-((1-(tert-Butoxycarbonyl)piperidin-3-yl)methyl)-1H-pyrazole-3-carboxylic acid	Boc-piperidine	Carboxylic acid
6	920665	2-(1-(1-(tert-Butoxycarbonyl)piperidin-3-yl)-1H-pyrazol-4-yl)acetic acid	Boc-piperidine	Carboxylic acid
6	920673	1-(1-(tert-Butoxycarbonyl)piperidin-3-yl)-1H-pyrazole-4-carboxylic acid	Boc-piperidine	Carboxylic acid
6	920703	((1-(tert-Butoxycarbonyl)piperidin-4-yl)methyl)proline	Boc-piperidine	Carboxylic acid
7	920487	1-((1-(tert-Butoxycarbonyl)azetid-3-yl)methyl)-1H-pyrazole-3-carboxylic acid	Boc-azetidine	Carboxylic acid
7	920495	2-(6-(1-(tert-Butoxycarbonyl)azetid-3-yl)pyrazin-2-yl)acetic acid	Boc-azetidine	Carboxylic acid
7	920576	1-((1-(tert-Butoxycarbonyl)azetid-3-yl)methyl)-1H-pyrazole-4-carboxylic acid	Boc-azetidine	Carboxylic acid
7	920584	5-(1-(tert-Butoxycarbonyl)azetid-3-yl)pyrazine-2-carboxylic acid	Boc-azetidine	Carboxylic acid
7	ADV638390284	1-(1-(tert-Butoxycarbonyl)azetid-3-yl)-1H-pyrazole-4-carboxylic acid	Boc-azetidine	Carboxylic acid
8	ENAH38A2CCD6	6-(((tert-butoxy)carbonyl)amino)-5H,6H,7H,8H-imidazo[1,2-a]pyridine-2-carboxylic acid	Boc-amino piperidine	Carboxylic acid
8	920509	3-(7-(tert-Butoxycarbonyl)-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazin-3-yl)propanoic acid	Boc-piperazine	Carboxylic acid
8	920657	3-(7-(tert-Butoxycarbonyl)-2-ethyl-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazin-3-yl)propanoic acid	Boc-piperazine	Carboxylic acid
8	AC5372910424	7-Boc-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazine-2-carboxylic Acid	Boc-piperidine	Carboxylic acid
8	920568	tert-Butyl 3-(5,6,7,8-tetrahydroimidazo[1,2-a]pyrazin-3-yl)propanoate	Piperidine	t-Butyl ester
9	920541	tert-Butyl 1-oxa-4,9-diazaspiro[5.6]dodecane-9-carboxylate	Boc-azepane	Morpholine
9	CH4979588668	tert-butyl 6-oxa-2,9-diazaspiro[4.5]decane-2-carboxylate	Boc-pyrrolidine	Morpholine
10	923311	4-((2-(tert-Butoxycarbonyl)-2-azaspiro[3.3]heptan-6-yl)oxy)picolinic acid	Boc-azetidine	Carboxylic acid
10	923328	5-((2-(tert-Butoxycarbonyl)-2-azaspiro[3.3]heptan-6-yl)oxy)pyrazine-2-carboxylic acid	Boc-azetidine	Carboxylic acid
10	923338	5-((2-(tert-butoxycarbonyl)-2-azaspiro[3.3]heptan-6-yl)oxy)pyrazine-2-carboxylic acid	Boc-azetidine	Carboxylic acid

Rigid Heterobifunctional Linkers: Diversity Sets - Continued

Set	Cat. No.	Product Name	End 1	End 2
10	923346	1-(2-(tert-Butoxycarbonyl)-2-azaspiro[3.3]heptan-6-yl)-1H-pyrazole-4-carboxylic acid	Boc-azetidine	Carboxylic acid
10	923370	6-((2-(tert-Butoxycarbonyl)-2-azaspiro[3.3]heptan-6-yl)oxy)pyrimidine-4-carboxylic acid	Boc-azetidine	Carboxylic acid
10	923419	2-(3-((2-(tert-Butoxycarbonyl)-2-azaspiro[3.3]heptan-6-yl)oxy)phenyl)acetic acid	Boc-azetidine	Carboxylic acid
10	923427	2-(4-((2-(tert-Butoxycarbonyl)-2-azaspiro[3.3]heptan-6-yl)oxy)piperidin-1-yl)acetic acid	Boc-azetidine	Carboxylic acid
11	923273	2-((3aR,7aR)-1-(tert-Butoxycarbonyl)octahydro-6H-pyrrolo[2,3-c]pyridin-6-yl)thiazole-4-carboxylic acid	Boc-pyrrolidine	Carboxylic acid
11	923281	2-((3aS,7aR)-1-(tert-Butoxycarbonyl)octahydro-6H-pyrrolo[2,3-c]pyridin-6-yl)isonicotinic acid	Boc-pyrrolidine	Carboxylic acid
11	923303	6-((3aS,7aR)-1-(tert-Butoxycarbonyl)octahydro-6H-pyrrolo[2,3-c]pyridin-6-yl)pyridazine-3-carboxylic acid	Boc-pyrrolidine	Carboxylic acid
12	923389	1-((2-(tert-Butoxycarbonyl)-5-oxa-2-azaspiro[3.4]octan-6-yl)methyl)piperidine-4-carboxylic acid	Boc-azetidine	Carboxylic acid
12	923397	1-((2-(tert-Butoxycarbonyl)-5-oxa-2-azaspiro[3.4]octan-6-yl)methyl)azetidine-3-carboxylic acid	Boc-azetidine	Carboxylic acid
12	923354	2-(6-((4-(tert-Butoxycarbonyl)piperazin-1-yl)methyl)-5-oxa-2-azaspiro[3.4]octan-2-yl)acetic acid	Boc-piperazine	Carboxylic acid
13	923249	3-(4-((7-(tert-Butoxycarbonyl)-7-azaspiro[3.5]nonan-2-yl)oxy)piperidin-1-yl)propanoic acid	Boc-piperidine	Carboxylic acid
13	923257	3-(3-((7-(tert-Butoxycarbonyl)-7-azaspiro[3.5]nonan-2-yl)oxy)piperidin-1-yl)propanoic acid	Boc-piperidine	Carboxylic acid
13	923265	4-((7-(tert-Butoxycarbonyl)-7-azaspiro[3.5]nonan-2-yl)oxy)picolinic acid	Boc-piperidine	Carboxylic acid
13	923400	4-((7-(tert-Butoxycarbonyl)-7-azaspiro[3.5]nonan-2-yl)oxy)benzoic acid	Boc-piperidine	Carboxylic acid

Other Rigid Heterobifunctional Linkers

Cat. No.	Product Name	End 1	End 2
900602	4-(4-(Prop-2-yn-1-yloxy)benzoyl)benzoic acid	Alkyne	Carboxylic acid
15485	N-Boc-p-phenylenediamine	Amine	Boc-amine
53175	N-Boc-m-phenylenediamine	Amine	Boc-amine
771139*	(E)-N-(2-Aminoethyl)-4-{2-[4-(3-azidopropoxy)phenyl]diazanyl}benzamide HCl	Azide	Amine
771066*	tert-Butyl 2-(4-{4-(3-azidopropoxy)phenyl}azo}benzamido)ethylcarbamate	Azide	Boc-amine
A3282	5-Azido-2-nitrobenzoic acid N-hydroxysuccinimide ester	Azide	NHS ester
806013	APN-BCN	Bicyclononyne	Nitrile
923362	2-(4-(5-bromopyridin-2-yl)-4,7-diazaspiro[2.5]octan-7-yl)acetic acid	Bromo	Carboxylic acid
806021	APN-CHO	Carbonyl	Nitrile
38784	4-[(2,4-Dimethoxyphenyl)(Fmoc-amino)methyl]phenoxyacetic acid	Fmoc-amine	Carboxylic acid
55543	4-Hydroxy-2-methoxybenzaldehyde	Hydroxyl	Carbonyl
43081	4-(Diphenylhydroxymethyl)benzoic acid	Hydroxyl	Carboxylic acid
55730	4-(Hydroxymethyl)phenoxyacetic acid	Hydroxyl	Carboxylic acid
382639	4-(Hydroxymethyl)benzoic acid	Hydroxyl	Carboxylic acid
771058*	4-(4'-Hydroxyphenylazo)benzoic acid	Hydroxyl	Carboxylic acid
803669	SIAB (N-succinimidyl (4-iodoacetyl)aminobenzoate)	Iodo	NHS ester
803324	Sulfo-SIAB (sulfosuccinimidyl (4-iodoacetyl)aminobenzoate)	Iodo	Sulfo-NHS ester
49667	4-(Maleinimido)phenyl isocyanate	Isocyanate	Maleimide
M2786	3-Maleimidobenzoic acid N-hydroxysuccinimide ester crystalline	Maleimide	NHS ester
M5525	4-(N-Maleimidomethyl)cyclohexanecarboxylic acid N-hydroxysuccinimide ester	Maleimide	NHS ester
803227	Sulfo-MBS (m-maleimidobenzoyl-N-hydroxysulfosuccinimide ester)	Maleimide	Sulfo-NHS ester
M6035	4-(N-Maleimidomethyl)cyclohexane-1-carboxylic acid 3-sulfo-NHS ester	Maleimide	Sulfo-NHS ester
806595	APN-Azide	Nitrile	Azide
807745	APN-COCl	Nitrile	Chloro
807664	CBTF	Nitrile	TFS ester
C11804	4-Sulfamoylbenzoic acid	Sulfonamide	Carboxylic acid
764396	(E)-Cyclooct-4-enol	TCO	Hydroxyl
761591	(4-(1,2,4,5-Tetrazin-3-yl)phenyl)methanamine hydrochloride	Tetrazine	Amine
764493	5-[4-(1,2,4,5-Tetrazin-3-yl)benzylamino]-5-oxopentanoic acid	Tetrazine	Carboxylic acid

*Photoswitchable

Alkyl Heterobifunctional Linkers

Cat. No.	Product Name	Length	End 1	End 2
742678	(1R,8S,9s)-Bicyclo[6.1.0]non-4-yn-9-ylmethanol	C1	Bicyclononyne	Hydroxyl
88271	Bromoacetic acid N-hydroxysuccinimide ester	C1	Bromo	NHS ester
19760	Iodoacetic acid N-hydroxysuccinimide ester	C1	Iodo	NHS ester
772828	5-Norbornene-2-endo-acetic acid	C1	Norbornene	Carboxylic acid
15369	N-Boc-ethylenediamine	C2	Amine	Boc-amine
15567	N-Boc-N-methylethylenediamine	C2	Amine	Boc-amine
454311	N-Z-Ethylenediamine hydrochloride	C2	Amine	Cbz-amine
47542	N-Fmoc-ethylenediamine hydrobromide	C2	Amine	Fmoc-amine
56951	N-(2-Aminoethyl)maleimide trifluoroacetate salt	C2	Amine	Maleimide
17354	2-(Boc-amino)ethyl bromide	C2	Bromo	Boc-amine
74291	2-(Fmoc-amino)ethyl bromide	C2	Bromo	Fmoc-amine
09767	N-Fmoc-2-bromoethylamin	C2	Bromo	Fmoc-amine
382027	N-Boc-ethanolamine	C2	Hydroxyl	Boc-amine
407909	N-Z-Ethanolamine	C2	Hydroxyl	Cbz-amine
445185	2-(Fmoc-amino)ethanol	C2	Hydroxyl	Fmoc-amine
773263	N-(2-Hydroxyethyl)maleimide	C2	Hydroxyl	Maleimide
63179	3-(Maleimido)propionic acid N-hydroxysuccinimide ester	C2	Maleimide	NHS ester
358657	3-Maleimidopropionic acid N-hydroxysuccinimide ester	C2	Maleimide	NHS ester
41314	2-Maleimidoethyl mesylate technical	C2	Mesylate	Maleimide
458910	2-(Boc-amino)ethanethiol	C2	Thiol	Boc-amine
901699	3-Mercaptopropanyl-N-hydroxysuccinimide ester	C2	Thiol	NHS ester
440507	N-(2-Hydroxyethyl)trifluoroacetamide	C2	Trifluoroacetamide	Hydroxyl
15408	N-Boc-1,3-propanediamine	C3	Amine	Boc-amine
436992	N-Boc-1,3-propanediamine	C3	Amine	Boc-amine
96092	N-Z-1,3-Propanediamine hydrochloride	C3	Amine	Cbz-amine
47556	N-Fmoc-1,3-propanediamine hydrobromide	C3	Amine	Fmoc-amine
17356	3-(Boc-amino)propyl bromide	C3	Bromo	Boc-amine
258083	4-Bromobutyric acid	C3	Bromo	Carboxylic acid
251933	4-Bromobutyl chloride	C3	Bromo	Chloro
76061	3-(Fmoc-amino)propyl bromide	C3	Bromo	Fmoc-amine
416444	3-(Boc-amino)-1-propanol	C3	Hydroxyl	Boc-amine
478709	Benzyl N-(3-hydroxypropyl)carbamate	C3	Hydroxyl	Cbz-amine
47305	3-(Fmoc-amino)-1-propanol	C3	Hydroxyl	Fmoc-amine
15530	N-Boc-3-isothiocyanatopropylamine	C3	Isothiocyanate	Boc-amine
63175	4-Maleimidobutyric acid N-hydroxysuccinimide ester	C3	Maleimide	NHS ester
42002	Sulfo-N-succinimidyl 4-maleimidobutyrate sodium salt	C3	Maleimide	Sulfo-NHS ester
86055	4-Sulfamoylbutyric acid technical	C3	Sulfonamide	Carboxylic acid
15404	N-Boc-1,4-butanediamine	C4	Amine	Boc-amine
96081	N-Z-1,4-Butanediamine hydrochloride	C4	Amine	Cbz-amine
47541	N-Fmoc-1,4-butanediamine hydrobromide	C4	Amine	Fmoc-amine
90303	4-(Boc-amino)butyl bromide technical	C4	Bromo	Boc-amine
15302	4-(Boc-amino)-1-butanol	C4	Hydroxyl	Boc-amine
95887	4-(Z-Amino)-1-butanol	C4	Hydroxyl	Cbz-amine
47295	4-(Fmoc-amino)-1-butanol	C4	Hydroxyl	Fmoc-amine
100919	N-(4-Bromobutyl)phthalimide	C4	Phthalimide	Bromo
91678	N-(4-Hydroxybutyl)trifluoroacetamide	C4	Trifluoroacetamide	Hydroxyl
15406	N-Boc-cadaverine	C5	Amine	Boc-amine
96091	N-Z-1,5-pentanediamine hydrochloride	C5	Amine	Cbz-amine
47544	N-Fmoc-cadaverine hydrobromide	C5	Amine	Fmoc-amine
47299	5-(Fmoc-amino)-1-pentanol	C5	Hydroxyl	Fmoc-amine
63177	6-Maleimidohexanoic acid N-hydroxysuccinimide ester	C5	Maleimide	NHS ester
568600	6-Maleimidohexanoic acid N-hydroxysuccinimide ester	C5	Maleimide	NHS ester

Alkyl Heterobifunctional Linkers - Continued

Cat. No.	Product Name	Length	End 1	End 2
79229	N-Boc-1,6-hexanediamine	C6	Amine	Boc-amine
437018	N-Boc-1,6-hexanediamine hydrochloride	C6	Amine	Boc-amine
47543	N-Fmoc-1,6-hexanediamine hydrobromide	C6	Amine	Fmoc-amine
89171	6-(Boc-amino)hexyl bromide	C6	Bromo	Boc-amine
15304	6-(Boc-amino)-1-hexanol	C6	Hydroxyl	Boc-amine
451088	6-Mercapto-1-hexanol	C6	Hydroxyl	Thiol
186481	6-Bromo-1-hexanol	C6	Hydroxyl	Bromo
95895	6-(Z-Amino)-1-hexanol	C6	Hydroxyl	Cbz-amine
47297	6-(Fmoc-amino)-1-hexanol	C6	Hydroxyl	Fmoc-amine
257583	8-Bromooctanoic acid	C7	Bromo	Carboxylic acid
294144	8-Bromo-1-octanol	C8	Bromo	Hydroxyl
541397	10-Bromodecanoic acid	C9	Bromo	Carboxylic acid

PEG Heterobifunctional Linkers

Cat. No.	Product Name	PEG	End 1	End 2
901567	Propargyl-PEG1-acid	1	Alkyne	Carboxylic acid
901579	t-Boc-N-amido-PEG1-CH ₂ CO ₂ H	1	Boc-Amine	Carboxylic acid
901573	Bromo-PEG1-acid	1	Carboxylic acid	Bromo
36816	Diethylene glycol monoallyl ether	2	Alkene	Hydroxyl
901566	Propargyl-PEG2-acid	2	Alkyne	Carboxylic acid
89761	N-Boc- 2,2'-(ethylenedioxy)diethylamine	2	Amine	Boc-amine
764485	2-[2-(tert-Butyldimethylsilyloxy)ethoxy]ethanamine	2	Amine	TBDMS
727423	2-[2-(2-Azidoethoxy)ethoxy]ethanol solution ~0.5 M	2	Azide	Hydroxyl
901577	t-Boc-N-amido-PEG2-CH ₂ CO ₂ H	2	Carboxylic acid	Boc-amine
901572	Bromo-PEG2-acid	2	Carboxylic acid	Bromo
901565	Propargyl-PEG3-acid	3	Alkyne	Carboxylic acid
17758	11-Azido-3,6,9-trioxaundecan-1-amine	3	Amine	Azide
93113	N-Boc-4,7,10-trioxa-1,13-tridecanediamine	3	Amine	Boc-amine
901575	t-Boc-N-amido-PEG3-CH ₂ CO ₂ H	3	Boc-Amine	Carboxylic acid
QBD11217	Bromoacetamido-dPEG®3-azide	3	Bromo	Azide
901568	Bromo-PEG3-acid	3	Carboxylic acid	Bromo
764248	Amino-PEG4-alkyne	4	Alkyne	Amine
QBD10249	Amino-dPEG®4-OH	4	Amine	Hydroxyl
902535	Amino-PEG4-t-butyl ester	4	Mesylate	Maleimide
901138	14-Azido-3,6,9,12-tetraoxatetradecan-1-amine	4	Azide	Amine
744751	14-Azido-3,6,9,12-tetraoxatetradecanoic acid solution ~0.5 M	4	Azide	Carboxylic acid
QBD10502	Azido-dPEG®4-acid	4	Azide	Carboxylic acid
QBD10501	Azido-dPEG®4-NHS ester	4	Azide	NHS ester
QBD10567	Azido-dPEG®4-TFP ester	4	Azide	TFP ester
30953	15-(Boc-amino)-4,7,10,13-tetraoxapentadecanoic acid	4	Boc-amine	Carboxylic acid
902551	BocNH-PEG4-acid	4	Boc-Amine	Carboxylic acid
QBD11221	Bromoacetamido-dPEG®4-amido-DBCO	4	Bromo	DBCO
QBD11200	Bromoacetamido-dPEG®4-TFP ester	4	Bromo	TFP ester
QBD11362	DBCO-dPEG®4-TFP ester	4	DBCO	TFP ester
QBD10213	Fmoc-N-amido-dPEG®4-acid	4	Fmoc-amine	Carboxylic acid
QBD10994	Fmoc-N-amido-dPEG®4-NHS ester	4	Fmoc-amine	NHS ester
QBD11000	Fmoc-N-amido-dPEG®4-TFP ester	4	Fmoc-amine	TFP ester
902586	Hydroxy-PEG4-t-butyl ester	4	Hydroxyl	t-Butyl ester
QBD11341	Hydroxy-dPEG®4-TFP ester	4	Hydroxyl	TFP ester
QBD10551	MAL-dPEG®4-TFP ester	4	Maleimide	TFP ester
QBD10011	Phthalimidooxy-dPEG®4-NHS ester	4	Phthalimidooxy	NHS ester
764167	Alkyne-PEG5-Acid	5	Alkyne	Carboxylic acid
764191	Alkyne-PEG5-N-hydroxysuccinimidyl ester	5	Alkyne	NHS ester

PEG Heterobifunctional Linkers - Continued

Cat. No.	Product Name	PEG	End 1	End 2
901155	17-Azido-3,6,9,12,15-pentaoxaheptadecan-1-amine	5	Amine	Azide
902527	Amino-PEG5-t-butyl ester	5	Alkyne	Carboxylic acid
910015	17-Azido-3,6,9,12,15-pentaoxaheptadecanoic acid	5	Azide	Carboxylic acid
902683	BocNH-PEG5-acid	5	Boc-Amine	Carboxylic acid
QBD10109	Acid-dPEG®5-NHS ester	5	Carboxylic acid	NHS ester
902691	Hydroxy-PEG5-t-butyl ester	5	Hydroxyl	t-Butyl ester
902667	Propargyl-PEG6-acid	6	Alkyne	Carboxylic acid
902659	Amino-PEG6-t-butyl ester	6	Amine	t-Butyl ester
QBD10067	Amino-dPEG®6-acid	6	Amino	Carboxylic acid
76172	O-(2-Aminoethyl)-O'-(2-azidoethyl)pentaethylene glycol	6	Azide	Amine
910007	20-Azido-3,6,9,12,15,18-hexaoxaicosanoic acid	6	Azide	Carboxylic acid
38263	21-(Boc-amino)-4,7,10,13,16,19-hexaoxaheneicosanoic acid	6	Boc-amine	Carboxylic acid
902675	BocNH-PEG6-acid	6	Boc-Amine	Carboxylic acid
902578	Hydroxy-PEG6-t-butyl ester	6	Hydroxyl	t-Butyl ester
QBD10523	Azido-dPEG®7-amine	7	Azide	Amine
689440	O-(2-Azidoethyl)heptaethylene glycol	7	Hydroxyl	Azide
QBD10277	Amino-dPEG®8-acid	8	Amine	Carboxylic acid
QBD10240	Amino-dPEG®8-OH	8	Amine	Hydroxyl
76318	O-(2-Aminoethyl)-O'-(2-azidoethyl)heptaethylene glycol	8	Azide	Amine
71613	O-(2-Azidoethyl)-O-[2-(diglycolyl-amino)ethyl]heptaethylene glycol	8	Azide	Carboxylic acid
QBD10512	Azido-dPEG®8-acid	8	Azide	Carboxylic acid
QBD10503	Azido-dPEG®8-NHS ester	8	Azide	NHS ester
QBD10995	Fmoc-N-amido-dPEG®8-NHS ester	8	Fmoc-amine	NHS ester
QBD11005	Fmoc-N-amido-dPEG®8-TFP ester	8	Fmoc-amine	TFP ester
QBD10552	MAL-dPEG®8-TFP ester	8	Maleimide	TFP ester
QBD10119	Acid-dPEG®9-NHS ester	9	Carboxylic acid	NHS ester
77787	O-(2-Aminoethyl)-O'-(2-azidoethyl)nonaethylene glycol	10	Azide	Amine

Mixed Heterobifunctional Linkers

Cat. No.	Product Name	Composition	End 1	End 2
910023	3,6,9,12,15,18-Hexaoxahexacos-25-ynoic acid	2-2-2-2-2-6	Alkyne	Carboxylic acid
910058	2-(2-(Oct-7-yn-1-yloxy)ethoxy)acetic acid	2-2-6	Alkyne	Carboxylic acid
909998	2,2-Dimethyl-4-oxo-3,11,14,17-tetraoxatricosan-23-oic acid	2-2-6	Carboxylic acid	t-Butyl ester
910074	27,27-Dimethyl-25-oxo-3,6,9,12,15,18,26-heptaoxaocacosanoic acid	6-2-2-2-2-2-2	Carboxylic acid	t-Butyl ester
910066	6-(2-(2-(Oct-7-yn-1-yloxy)ethoxy)ethoxy)hexanoic acid	6-2-2-6	Alkyne	Carboxylic acid
761532	Dibenzocyclooctyne-S-S-N-hydroxysuccinimidyl ester	Disulfide	DBCO	NHS ester
803480	PDPH	Disulfide	Pyridyldithiol	Hydrazide
803472	SMPT	Disulfide	Pyridyldithiol	NHS ester
803499	PEG4-SPDP	Disulfide	Pyridyldithiol	NHS ester
803642	LC-SPDP	Disulfide	Pyridyldithiol	NHS ester
P3415	3-(2-Pyridyldithio)propionic acid NHS ester	Disulfide	Pyridyldithiol	NHS ester
QBD10374	SPDP-dPEG®4-NHS ester	Disulfide	Pyridyldithiol	NHS ester
QBD10376	SPDP-dPEG®8-NHS ester	Disulfide	Pyridyldithiol	NHS ester
803316	Sulfo-LC-SPDP	Disulfide	Sulfo-NHS ester	Pyridyldithiol
764221	Propargyl-N-hydroxysuccinimidyl ester		Alkyne	NHS ester
745073	BCN-amine		Amine	Bicyclononyne
790451	TCO-amine HCl salt		Amine	TCO
804665	Azido-PEG4-phenyloxadiazole methylsulfone		Azide	Methyl sulfone
ALD00344	PTAD-Azide		Azide	PTAD
803332	Sulfo-SANPAH		Azide	Sulfo-NHS ester
744867	BCN-NHS		Bicyclononyne	NHS ester
803650	SBAP		Bromo	NHS ester

Mixed Heterobifunctional Linkers - Continued

Cat. No.	Product Name	End 1	End 2
761540	Dibenzocyclooctyne-amine	DBCO	Amine
759902	Dibenzocyclooctyne-PEG4-acid	DBCO	Carboxylic acid
761516	Dibenzocyclooctyne-acid	DBCO	Carboxylic acid
797685	ADIBO-PEG4-acid	DBCO	Carboxylic acid
761524	Dibenzocyclooctyne-N-hydroxysuccinimidyl ester	DBCO	NHS ester
764019	Dibenzocyclooctyne-PEG4-N-hydroxysuccinimidyl ester	DBCO	NHS ester
762040	Dibenzocyclooctyne-sulfo-N-hydroxysuccinimidyl ester	DBCO	Sulfo-NHS ester
QBD11815	DBCO-TFP ester	DBCO	TFP ester
671401	N-Boc-N'-succinyl-4,7,10-trioxa-1,13-tridecanediamine	Fmoc-amine	Carboxylic acid
671517	N-Fmoc-N''-succinyl-4,7,10-trioxa-1,13-tridecanediamine	Fmoc-amine	Carboxylic acid
761982	Dibenzocyclooctyne-PEG4-alcohol	Hydroxyl	DBCO
764205	Alkyne-PEG4-maleimide	Maleimide	Alkyne
760668	Dibenzocyclooctyne-maleimide	Maleimide	DBCO
760676	Dibenzocyclooctyne-PEG4-maleimide	Maleimide	DBCO
803456	KMUH	Maleimide	Hydrazide
803502	MPBH	Maleimide	Hydrazide
803529	BMPH	Maleimide	Hydrazide
803677	EMCH	Maleimide	Hydrazide
712582	Mal-PEG4-NHS-ester	Maleimide	NHS ester
746193	Maleimide-PEG6-succinimidyl ester	Maleimide	NHS ester
746207	Maleimide-PEG8-succinimidyl ester	Maleimide	NHS ester
746223	Maleimide-PEG2-succinimidyl ester	Maleimide	NHS ester
803383	LC-SMCC	Maleimide	NHS ester
803626	SMPH	Maleimide	NHS ester
M3884	Maleimidoacetic acid N-hydroxysuccinimide este	Maleimide	NHS ester
M9794	6-Maleimidohexanoic acid N-hydroxysuccinimide ester	Maleimide	NHS ester
803235	Sulfo-EMCS	Maleimide	Sulfo-NHS ester
803243	Sulfo-SMPB	Maleimide	Sulfo-NHS ester
803251	Sulfo-KMUS	Maleimide	Sulfo-NHS ester
790443	TCO-PEG3-maleimide	Maleimide	TCO
776173	5-Norbornene-2-acetic acid succinimidyl ester	Norbornene	NHS ester
B66302	N-(2-Bromoethyl)phthalimide	Phthalimide	Bromo
B80003	N-(3-Bromopropyl)phthalimide	Phthalimide	Bromo
900927	TCO-PNB ester	p-nitrobenzyl	TCO
764523	(E)-Cyclooct-4-enyl 2,5-dioxo-1-pyrrolidinyl carbonate	TCO	NHS ester
790435	TCO PEG4 succinimidyl ester	TCO	NHS ester
764701	Benzylaminotetrazine-NHS	Tetrazine	NHS ester
900894	Methyltetrazine-PEG4-NHS ester	Tetrazine	NHS ester
900913	Tetrazine-PEG5-NHS ester	Tetrazine	NHS ester
900914	Methyltetrazine-NHS ester	Tetrazine	NHS ester

Part 2: Target Validation

Visualizing Endogenous PROTAC Interactions with Duolink Proximity Ligation Assays

A key step in the targeted protein degradation discovery workflow is validating that your molecules are engaging the E3 ligase and target, driving a complex formation that leads to ubiquitination and degradation. Duolink® is a Proximity Ligation assay (PLA) which allows a researcher to screen and validate the endogenous protein degradation process, without the use of specialized equipment or genetic modification.

Duolink® PLA combines the specificity of antibodies with the sensitivity afforded by rolling circle amplification to detect endogenous proteins in fixed cells and tissues. A pair of oligonucleotide-labeled antibodies (PLA probes) generates an amplified signal only when the probes are in close proximity (<40nm). There are two different assay formats involving either directly labeled antibodies or using labeled secondaries with the latter demonstrated in **Figure 7**.

Figure 7.



Two separate antibodies bind two proteins of interest or two epitopes of a single protein

Secondary antibodies with PLA probes (PLUS and MINUS) are added

Two circle-forming DNA oligonucleotides and the ligation enzyme are added

Polymerase amplifies the DNA circle. Fluorescently labeled, complementary oligonucleotide probes bind to the amplified DNA.

Each signal is composed of ~1000 bound fluorescent probes that appear as a distinct dot that can be easily visualized under the microscope.

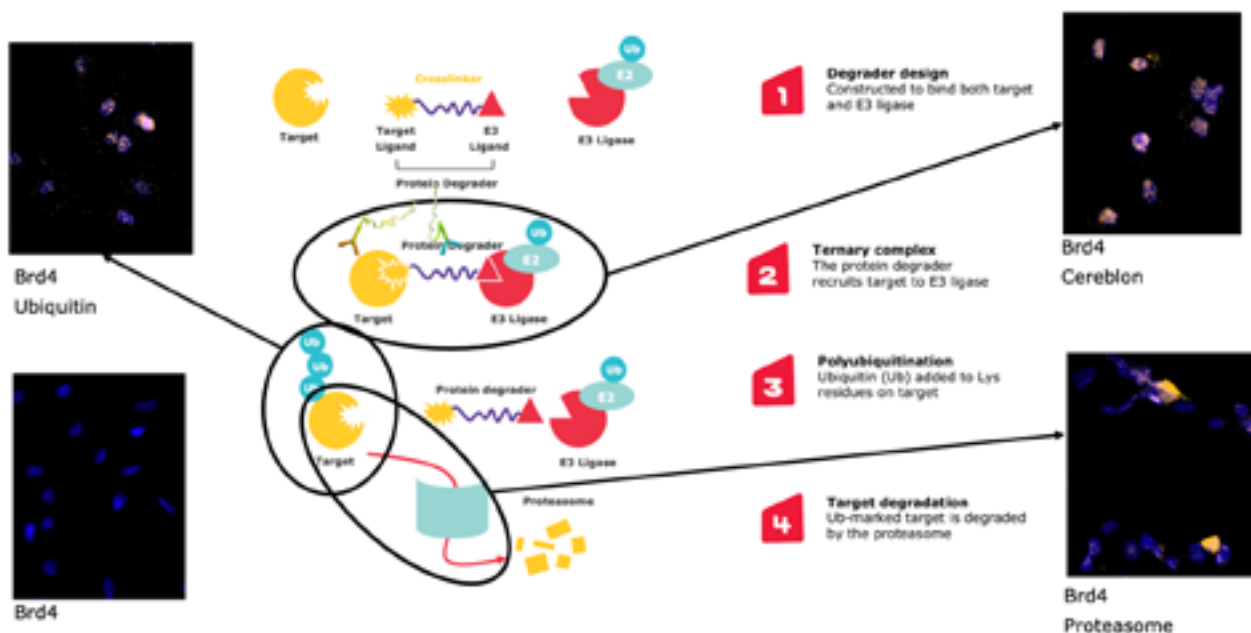
Visualizing PROTAC Interactions

One established PROTAC system uses dBet1 to target Brd4 to the cereblon E3 ligase.²¹ Using this degrader, we validated that Duolink® could monitor Brd4 (HPA015055):Crbn, Brd4:Ubiquitin (SAB2702287)

and Brd4:Proteasome (SAB2501530) interaction in SKOV3 cells (**Figure 8**). The technical control of single antibodies shows no Duolink® signal indicating measurement of our specific protein:protein interaction.

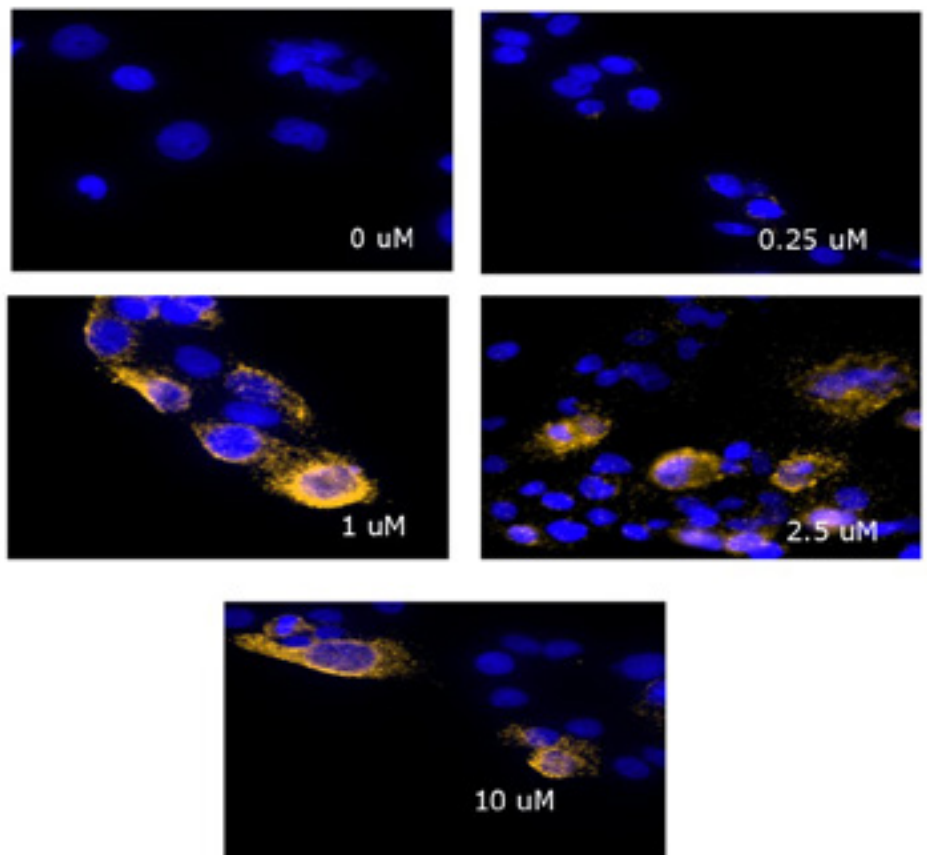
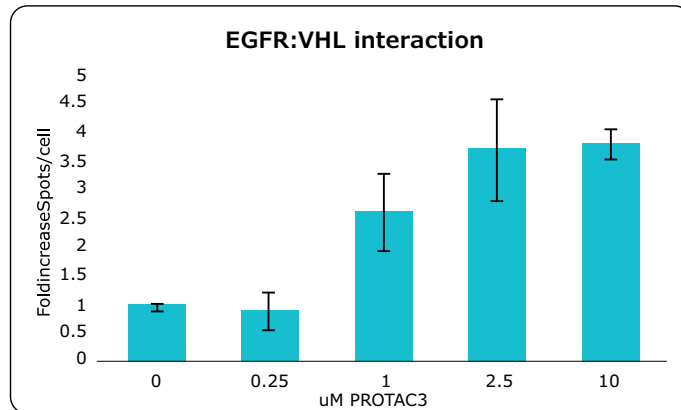
Figure 8.

Duolink Monitoring Degradation in Action



Similarly, we investigated EGFR:VHL interactions, this time doing a dose dependent curve showing an increasing EGFR:VHL complex being formed with increasing concentrations of PROTAC3²² after 1 hour in the HCC827 cells harboring EGFR exon 19 deletion. After treatment the cells were fixed and permeabilized. We used Mouse EGFR (E3138) and Goat Anti-VHL (SAB2501099) to target our EGFR:PROTAC pair, then ran the Duolink[®] In Situ Orange kit (DUO92007) using anti-goat PLUS (DUO92003) and anti-mouse MINUS (DUO92004) PLA Probes (**Figure 9**). As PROTAC3 concentration is increased, you see an increase in EGFR:VHL interaction, as seen both when counting spots as well as visually.

Figure 9.



Duolink® Products

Cat. No.	Product Name
DUO92101	Duolink® In Situ Red Starter Kit Mouse/Rabbit
DUO92008	Duolink® In Situ Detection Reagents Red
DUO92102	Duolink® In Situ Orange Starter Kit Mouse/Rabbit
DUO92007	Duolink® In Situ Detection Reagents Orange
DUO92009	Duolink® In Situ Probemaker PLUS
DUO92010	Duolink® In Situ Probemaker MINUS
DUO92202	Duolink® PLA Control Kit - PPI, Control Kit
DUO94003	Duolink® flowPLA Detection Kit - Orange, Duolink® PLA kit for Flow Cytometry

E3 Ligase Ligands and Molecular Glues for Validation and Pathway Analyses

Cat. No.	Product Name	E3 Ligase	Target
T144	(±)-Thalidomide	CRBN	IKZF1, IKZF3
T150	(-)-Thalidomide	CRBN	IKZF1, IKZF3
T151	(+)-Thalidomide	CRBN	IKZF1, IKZF3
P0018	Pomalidomide	CRBN	IKZF1, IKZF3
901494	N-Methylated Pomalidomide	CRBN	Pomalidomide Negative Control
901558	Lenalidomide	CRBN	IKZF1, IKZF3, CK1a
SML2283	Lenalidomide	CRBN	IKZF1, IKZF3, CK1a
911690	C5 Lenalidomide	CRBN	
901490	(S,R,S)-AHPC HCl (VH032)	VHL	
901487	(S,S,S)-AHPC HCl	VHL	(S,R,S)-AHPC Negative Control
920908	(S,R,S)-VL285 Phenol	VHL	
924202	5-Amino-Thalidomide	CRBN	
9244229	(S,R,S)-AHPC-Me	VHL	
SML1896	VH298	VHL	
N6287	Nutlin-3	MDM2	
SML0580	Nutlin-3a	MDM2	
444143	MDM2 Antagonist, Nutlin-3, Racemic	MDM2	
444152	MDM2 Antagonist IV, Nutlin-3a	MDM2	
444151	InSolution Nutlin-3, Racemic	MDM2	
919381	CCW16	RNF4	
SML2981	EN219	RNF114	
SML2950	E7820	DCAF15	RBM39
SML1225	Indisulam	DCAF15	RBM39
SML2952	Tasisulam	DCAF15	RBM39
C3249	CR8	DDB1	Cyclin K
SML2990	dCeMM2	DDB1	Cyclin K

Validated Bifunctional Degraders

Cat. No.	Product Name	E3 Ligase	E3 Ligand	Target	Target Ligand
SML2911	dBRD9 HCl	CRBN	Pomalidomide	BRD9	BI 7273
SML2686	THAL-SNS-032	CRBN	Pomalidomide	CDK9	SNS-032
SML2683	dBET6	CRBN	Thalidomide	BRD2, BRD3 and BRD4	JQ1
SML2687	dBET1	CRBN	Thalidomide	BRD4	JQ1
SML2601	dTAG-13	CRBN	Thalidomide	FKBP12F36V	AP1867
SML2923	ARV-771	VHL	VH032	BRD2, BRD3 and BRD4	JQ1
SML2684	dTRIM24	VHL	VL-269	TRIM24	IACS-7e
SML3041	CRBN-6-5-5-VHL	CRBN	Pomalidomide	VHL	VH032

Other Bioactive Small Molecules

Cat. No.	Product Name	Note
474790	MG-132	Cell-permeable, potent, reversible proteasome inhibitor
M7449	MG-132, Ready Made Solution	10 mM MG-132 (1 mg/210 µL) 0.2 µm-filtered solution in DMSO
5.33965	IAP Antagonist, BV6	Bivalent SMAC mimetic: antagonizes cIAP1 and XIAP interaction with initiator caspases and triggers their proteasomal degradation
5.32814	MDM2 Inhibitor, SP-141	
373227	MDM2 Inhibitor VII, MEL23	
444145	MDM2 Inhibitor	
444144	MDM2 Antagonist II	
5.05987	Keap1-Nrf2 Interaction Probe	
SML0456	HBB2	Inducer of the KEAP1/NRF2/ARE pathway
SML1922	K67	Specific inhibitor against the interaction between DC domain and S349-phosphorylated KIR of p62/SQSTM1
SML0959	Bis-1,4-(4-methoxybenzenesulfonamidyl) naphthalene	Non-covalent inhibitor of the interaction between KEAP1 and Nrf2
492041	Nrf2 Activator II	Cell-permeable chloro-quinolinone compound that selectively and covalently modifies Keap1-Cys151 and represses Keap1 function and reduces Nrf2-Keap1 interaction
SML2021	MIND4-17	NRF2 activator that covalently modifies a critical stress-sensor cysteine (C151) in the BTB domain of the E3 ligase substrate adaptor protein KEAP1
SML0009	AI-1	Promotes Nrf2 activation via the covalent modification of Keap1
SML2240	IU1-47	Inhibitor of the deubiquitinating enzyme UPS14
L4170	LDN-57444	Ubiquitin C-terminal hydrolase-L1 (UCH-L1) inhibitor
M6545	Mitoxantrone Dihydrochloride	USP11 inhibitor
SML1177	ML323	USP1-UAF1 Inhibitor
SML0270	NSC 632839	Ubiquitin isopeptidases inhibitor targets the ubiquitinproteasome system (UPS)
SML0430	PR-619	Cell permeable broad spectrum deubiquitylating enzymes (DBUs) inhibitor
SML0440	Spautin-1	Inhibits the activity of two ubiquitin-specific peptidases, USP10 and USP13
SML1402	TCID	TCID is a cell penetrant, potent, and specific inhibitor of UCH-L3 (Ubiquitin carboxyl-terminal hydrolase isozyme L3). TCID is used to distinguish between UCH-L1 and UCH-L3 activities in cells.

Ubiquitin Research Tools

Cat. No.	Product Name	Note
14-1121	MultiDsk-Ubiquitin-Binding Protein Reagent	Ubiquitin enrichment: Ubiquitin-binding protein reagent validated for use in affinity precipitation assays for the pull-down of mono- and poly-ubiquitinated proteins
662200	Ubiquitin Enrichment Kit	Ubiquitin enrichment: Agarose beads for the enrichment of polyubiquitinated proteins from cell and tissue lysates
U5382	Ubiquitin Human	Recombinant protein: Expressed in <i>E. coli</i> (N-terminal FLAG® tagged), essentially salt-free, lyophilized powder
U5507	Ubiquitin Human	Recombinant protein: Expressed in <i>E. coli</i> (N-terminal histidine tagged)
662057	Ubiquitin	Recombinant protein: Expressed in <i>E. coli</i> ; GST-Fusion
SRP6133	Ubiquitin-K48 Human	Recombinant protein: Expressed in <i>E. coli</i>
SRP6173	Ubiquitin-K63 Human	Recombinant protein, expressed in <i>E. coli</i>
709468	Ubiquitin-13C,15N Human	Recombinant protein, expressed in <i>E. coli</i>
17-10388	Di-Ubiquitin (Lys63-Linked)	Recombinant protein: Native K63 linked Di-Ubiquitin which can be used as a substrate for proteases that cleave the isopeptide linkage between two ubiquitin molecules.
14-1128	Di-Ubiquitin (Linear)	Recombinant protein
SRP6143	Linear Di-Ubiquitin Human	Recombinant protein
SRP6145	Linear Tetra-Ubiquitin Human	Recombinant protein
SRP6140	hSUMO1-AMC Human	hSUMO protease activity probe
SRP6141	hSUMO2-AMC Human	hSUMO protease activity probe
SRP6521	Ubiquitin-Fluorescein-Labeled (FLR-Ub)	Fluorescently labeled ubiquitin
SRP6522	Ubiquitin-TAMRA-Labeled (TMR-Ub)	Fluorescently labeled ubiquitin
U2258	Ubiquitin-7-Amido-4-Methylcoumarin	Fluorogenic Ub-based probe
SRP6139	Ubiquitin-Rhodamine human	Recombinant protein, expressed in <i>E. coli</i>
SRP6142	hSUMO2-Rhodamine human	Recombinant protein, expressed in <i>E. coli</i>

Recombinant E3 Ligases

Cat. No.	Product Name	Note
23-044-M	VHL Protein Complex, Active	Recombinant E3 ligase: Active complex of five recombinant human enzymes: VHL amino acids 54-end, full length Elongin C, full length Elongin B, full-length Cul2, and full-length Rbx1
SRP2084	VHL Human	Recombinant E3 ligase: Expressed in insect cells
SRP0230	XIAP Active Human	Recombinant E3 ligase: Expressed in baculovirus infected insect cells
23-056-M	XIAP, Active	Recombinant E3 ligase
M0321	MDM2, GST-Tagged Human	Recombinant E3 ligase: Expressed in <i>E. coli</i>
SRP2095	MDM2, HIS tagged human	Recombinant E3 ligase: Expressed in <i>E. coli</i>
23-033-M	MDM2 (c-Myc tagged) Protein, active, 10 µg	Recombinant E3 ligase: N-terminal GST-tagged, recombinant human TRAF6 full length, expressed in <i>E. coli</i>
SRP0226	NEDD4 Active Human	Recombinant, expressed in baculovirus infected insect cells
23-030-M	SCF-Fbw7 Protein Complex, Active, 10 µg	Active complex of four full length, recombinant human enzymes: Fbw7, Skp1, Cul1 & Rbx1..
23-023-M	SCF-Skp2 Protein Complex, Active, 10 µg	Active complex of five full length, recombinant human enzymes: Skp1, Skp2, Cul1, Rbx1 & Cks1

Prestige Antigens™

Cat. No.	Product Name	Note
APREST79292	PrEST Antigen CRBN	Recombinant protein fragment of Human CRBN with N-terminal His6ABP fusion tag
APREST90752	PrEST Antigen VHL	Recombinant protein fragment of Human VHL with N-terminal His6ABP fusion tag
APREST90753	PrEST Antigen VHL	Recombinant protein fragment of Human VHL with N-terminal His6ABP fusion tag
APREST74397	PrEST Antigen VBP1	Recombinant protein fragment of Human VBP1 with N-terminal His6ABP fusion tag
APREST85278	PrEST Antigen RNF4	Recombinant protein fragment of Human RNF4 with N-terminal His6ABP fusion tag.
APREST73706	PrEST Antigen RNF114	Recombinant protein fragment of Human RNF114 with N-terminal His6ABP fusion tag
APREST71262	PrEST Antigen RNF43	Recombinant protein fragment of Human RNF43 with N-terminal His6ABP fusion tag
APREST84231	PrEST Antigen DCAF16	Recombinant protein fragment of Human DCAF16 with N-terminal His6ABP fusion tag
APREST86908	PrEST Antigen KEAP1	Recombinant protein fragment of Human KEAP1 with N-terminal His6ABP fusion tag
APREST78063	PrEST Antigen AHR	Recombinant protein fragment of Human AHR with N-terminal His6ABP fusion tag
APREST78064	PrEST Antigen AHR	Recombinant protein fragment of Human AHR with N-terminal His6ABP fusion tag
APREST81425	PrEST Antigen NEDD4	Recombinant protein fragment of Human NEDD4 with N-terminal His6ABP fusion tag.

MISSION® esiRNA and MISSION® shRNA

Cat. No.	Product Name
EHU047571	MISSION® esiRNA Targeting Human CRBN
EMU062881	MISSION® esiRNA Targeting Mouse CRBN
EMU079211	MISSION® esiRNA Targeting Mouse Vbp1
EHU034711	MISSION® esiRNA Targeting Human VBP1
EHU074571	MISSION® esiRNA Targeting Human VHL
EMU012571	MISSION® esiRNA Targeting Mouse VHL
EHU109631	MISSION® esiRNA Targeting Human RNF4
EMU080321	MISSION® esiRNA Targeting Mouse RNF4
EHU130541	MISSION® esiRNA Targeting Human DCAF15
EHU098571	MISSION® esiRNA Targeting Human MDM2
EMU026991	MISSION® esiRNA Targeting Mouse MDM2
EMU081511	MISSION® esiRNA Targeting Human Rnf114
EHU058181	MISSION® esiRNA Targeting Human RNF43
EHU130031	MISSION® esiRNA Targeting Human DCAF16
EHU065431	MISSION® esiRNA Targeting Human KEAP1
EHU039071	MISSION® esiRNA Targeting Human AHR
EMU085211	MISSION® esiRNA Targeting Mouse AHR
EHU132581	MISSION® esiRNA Targeting Human NEDD4
EMU056671	MISSION® esiRNA Targeting Mouse NEDD4
SH2121	MISSION® shRNA Human Gene Family Set, DNA, Ubiquitin Ligases (E1,E2,E3)
SH0721	MISSION® shRNA Human Gene Family Set, DNA, Ubiquitin Hydrolases (DUBS)
SH0711	MISSION® shRNA Human Gene Family Set, Bacterial Glycerol Stock, Ubiquitin Hydrolases (DUBS)
SH2111	MISSION® shRNA Human Gene Family Set, Bacterial Glycerol Stock, Ubiquitin Ligases (E1,E2,E3)
SH0731	MISSION® shRNA Human Gene Family Set, Lentiviral Particles, Ubiquitin Hydrolases (DUBS)
SH2131	MISSION® shRNA Human Gene Family Set, Lentiviral Particles, Ubiquitin Ligases (E1,E2,E3)

Cell Lines

Cat. No.	Product Name	Note
03112703-1VL	RCC4plusVHL	Cell line: Renal cell carcinoma cell line RCC4 stably transfected with pcDNA3-VHL
03112702	RCC4 plus vector alone	Renal cell carcinoma cell line RCC4 stably transfected with an empty expression vector, pcDNA3, conferring neomycin resistance. This cell line is VHL-deficient i.e. the von Hippel-Lindau tumour suppressor gene product is not expressed. These cells are tumourigenic.
MTOX1013	MTOX1013	From human female liver (hepatocarcinoma and hepatitis C tumor)

Antibodies

Cat. No.	Product Name
MABN1780	Anti-Cereblon Antibody, Clone 3B12F7
MABN1849	Anti-Cereblon Antibody, Clone 4A7H6
SAB1407456	Anti-CRBN Antibody Produced In Mouse
ZRB1304	Anti-CRBN Antibody, Clone 3I23 ZooMAb® Rabbit Monoclonal
HPA045910	Anti-CRBN Antibody Produced In Rabbit
SAB2106014	Anti-CRBN, (N-Terminal) Antibody Produced In Rabbit
HPA031631	Anti-VHL Antibody Produced In Rabbit
HPA031632	Anti-VHL Antibody Produced In Rabbit
SAB4200434	Anti-VHL Antibody Produced In Rabbit
SAB4503075	Anti-VHL Antibody Produced In Rabbit
MABC14	Anti-VHL Antibody, Clone 11E12
SAB2501099	Anti-VHL Antibody Produced In Goat
WH0007428M1	Monoclonal Anti-VHL Antibody Produced In Mouse
SAB2501099	Anti-VHL Antibody Produced In Goat
WH0007411M1	Monoclonal Anti-VBP1 Antibody Produced In Mouse
SAB1406582	Anti-VHL Antibody Produced In Mouse
HPA023230	Anti-VBP1 Antibody Produced In Rabbit
WH0007411M1	Monoclonal Anti-VBP1 Antibody Produced In Mouse
SAB1406578	Anti-VBP1 Antibody Produced In Mouse
PRS3331	Anti-XIAP Antibody Produced In Rabbit
HPA042428	Anti-XIAP Antibody Produced In Rabbit
X4503	Anti-XIAP Antibody Produced In Goat
HPA049356	Anti-RNF4 Antibody Produced In Rabbit
SAB1100321	Anti-RNF4 (11-25) Antibody Produced In Rabbit
SAB1100322	Anti-RNF4 (176-190) Antibody Produced In Rabbit
SAB4200645	Monoclonal Anti-RNF4 Antibody Produced In Mouse
SAB1103260	Anti-DCAF15 (567-580) Antibody Produced In Rabbit
M8558	Monoclonal Anti-MDM2 Antibody Produced In Mouse
WH0004193M1	Monoclonal Anti-MDM2 Antibody Produced In Mouse
SAB4501849	Anti-MDM2 Antibody Produced In Rabbit
SAB4501850	Anti-MDM2 Antibody Produced In Rabbit
SAB4501851	Anti-MDM2 Antibody Produced In Rabbit
SAB4300601	Anti-MDM2 (Ab-166) Antibody Produced In Rabbit
SAB2500625	Anti-MDM2 (Isoform) Antibody Produced In Goat
GW21160	Anti-MDM2 Antibody Produced In Chicken
M7815	Anti-MDM2 Antibody ,Mouse Monoclonal, Clone HDM2-323
M4308	Monoclonal Anti-MDM2 Antibody Produced In Mouse
RAB1578	Human MDM2 ELISA For Serum, Plasma And Cell Culture Supernatants
SAB1407712	Anti-RNF114 Antibody Produced In Mouse
HPA021184	Anti-RNF114 Antibody Produced In Rabbit
MABC606	Anti-RNF43 Antibody, Clone 11C3.1, Clone 11C3.1, From Mouse
HPA008079	Anti-RNF43 Antibody Produced In Rabbit,
SAB2102033	Anti-RNF43 Antibody Produced In Rabbit

Cat. No.	Product Name
HPA042487	Anti-DCAF16 Antibody Produced In Rabbit
MABC713	Anti-KEAP1, Clone 7G4B10 Antibody, Clone 7G4B10, From Mouse
AV38981	Anti-KEAP1 (AB2) Antibody Produced In Rabbit
AV34727	Anti-KEAP1 (AB1) Antibody Produced In Rabbit
K3144	Anti-Keap1 Antibody Produced In Rabbit
HPA005558	Anti-KEAP1 Antibody Produced In Rabbit
WH0000196M2	Monoclonal Anti-AHR Antibody Produced In Mouse
SAB1403535	Monoclonal Anti-AHR Antibody Produced In Mouse
HPA029722	Anti-AHR Antibody Produced In Rabbit
HPA029723	Anti-AHR Antibody Produced In Rabbit,
SAB1412325	Anti-AHR Antibody Produced In Mouse
SAB1412326	Anti-AHR Antibody Produced In Mouse
SAB1412327	Anti-AHR Antibody Produced In Mouse
SAB1405440	Anti-AHR Antibody Produced In Mouse
SAB4500725	Anti-AHR Antibody Produced In Rabbit
AV31635	Anti-AHR (AB1) Antibody Produced In Rabbit
HPA039883	Anti-NEDD4 Antibody Produced In Rabbit
SAB2101562	Anti-NEDD4 Antibody Produced In Rabbit
ZRB1494	Anti-P-Ubiquitin (Pser65) Antibody, Clone 2N21 ZooMAb® Rabbit Monoclonal
ZRB2150	Anti-Ubiquitin K48-Specific Antibody, Clone Apu2 ZooMAb® Rabbit Monoclonal
ZRB2114	Anti-Linear Ubiquitin Antibody, Clone 1E3 ZooMAb® Rabbit Monoclonal
662099	Anti-Ubiquitin Rabbit Pab
U5379	Anti-Ubiquitin Antibody Produced In Rabbit
SAB2702287	Monoclonal Anti-Ubiquitin Antibody Produced In Mouse
SAB1306582	Anti-Ubiquitin Antibody Produced In Rabbit
MABS486	Anti-Ubiquitin (Pan) Antibody, Clone 2G7B8
07-2130	Anti-Ubiquitin Antibody From Rabbit
05-944	Anti-Ubiquitin Antibody, Clone P4D1-A11
SAB4503053	Anti-Ubiquitin Antibody Produced In Rabbit
05-1308	Anti-Ubiquitin Antibody, Lys63-Specific, Clone Apu3, Rabbit Monoclonal
05-1307-AF488	Anti-Ubiquitin, Lys48-Specific, Clone Apu2, Alexa Fluor® 488 Conjugate
SAB2702288	Monoclonal Anti-Ubiquitin Antibody Produced In Mouse
ST1200	Anti-Ubiquitin Mouse Mab (FK2)
04-263	Anti-Ubiquitinylated Proteins Antibody, Clone FK2
SAB2501530	Anti-PSMA4 Antibody Produced In Goat
HPA015055	Anti-BRD4 Antibody Produced In Rabbit
E3138	Monoclonal Anti-Epidermal Growth Factor Receptor Antibody Produced In Mouse

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