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Declaration of interests Prof. Nicole Concin

Consulting/Advisory: MSD, ImmunoGen, Seagen, Akesobio, EISAI, GSK, AstraZeneca, Mersana, Seattle Genetics, eTheRNA immunotherapies NV, KARTOS

Travel Expenses: Roche, Genmab, Amgen

Educational fees: Kartos, MSD, Medscape Oncology, TouchIME

Functions in societies: Past-President of ESGO Chair of ENGOT Early Drug Development Network FIGO Committee for women's cancer

Antibody-Drug Conjugates (ADCs)





260 tested, green FDA approved, Blue activity reported, red stopped

Maecker H et al, MAbs. 2023 Petersen et al. Mol Cancer Ther. 2024 Chau CH, Steeg PS, Figg WD, Lancet 2019 Mullard A, Nat Rev Drug Discov 2013

ADCs UNDER CLINICAL DEVELOPMENT IN GYNAE ONC

Non exhaustive

Target	Drug	DAR	Tumor type
	XMT-1660 ¹	6	Ovarian, endometrial
B7-H4	SGN-B7H4V ^{2–4}	4	Ovarian, endometrial
	AZD8205 ^{5,6}	8	Ovarian, endometrial
CDH6	DS-6000a ^{7,8}	~8	Ovarian
	Mirvetuximab soravtansine	3.4	Ovarien, endometrial
EDa	IMGN-151	3.5	Ovarian, endometrial
ГКИ	Luveltamab tazevibulin (STRO-002) ^{9,10}	4	Ovarian, endometrial
	Farletuzumab ecteribulin (MORAb-202) ^{11,12}	4	Ovarian, endometrial
HER2	SYD985 ^{13,14}	2.7	Ovarian, endometrial
	T-DXd ^{15,16}	7–8	Cervical, ovarian, endometrial
	DB-1303/BNT323 ^{17,18}	~8	Endometrial
Mesothelin	BMS-986148 ^{19,20}	3	Ovarian
Tissue factor	XB002 ^{21,22}	4	Cervical, ovarian
- TROP2 -	Sacituzumab govitecan ^{23, 24}	7.5	Cervical, ovarian, endometrial
	DB-1305 ^{25, 26}	~4	Ovarian, endometrial
	Sacituzumab tirumotecan (MK-2870/SKB264) ²⁷	7.4	Cervix, endometrial

Why ADCs?

Engineered to limit systemic toxicity and improve the therapeutic index of cytotoxic agents

ADCs are a class of targeted therapies that are designed to selectively deliver cytotoxic drugs to cancer cells¹



ADC, antibody-drug conjugate; MED, minimum effective dose; MTD, maximum tolerated dose. 1. Criscitiello C et al. *J Hematol Oncol*. 2021;14(1):20. 2. Panowski S et al. *MAbs*. 2014;6(1):34–45.

Structure of Antibody-Drug Conjugates (ADCs)



ADCs: Mechanism of action

Antibody-Drug Conjugate



Structure + Function of ADCs: TARGET ANTIGEN

Antigen

- Homogenous expression on surface of tumour cells
- Low/no expression on healthy tissue



- High affinity and avidity for antibody recognition





Structure + Function of ADCs: COGNATE ANTIBODY

Antibody



Structure + Function of ADCs: LINKER

Properties of the linker

- Stability in systemic circulation
- Efficient release of payload at target site



Two categories of lin

CLEAVABLE

= important modulators of overall AUC toxicity pharmacokinetics, pharmacodynamics and toxicity Jutathione concentrations (disulphide linkers)

NON-CLE

Append on lysosomal degradation of the antibody

payload release

form nonreducible bonds with the antibody e.g. thioether linker

Drago JZ et al. Nat Rev Clin Oncol 2021 .Lu J et al. Int J Mol Sci. 2016 Sau S et al. Drug Discov Today. 2017 Chau CH, Steeg PS, Figg WD, Lancet 2019 Khongorzul et al, Molecular Cancer Research 2019

Structure + Function of ADCs: LINKER



Structure + Function of ADCs: CYTOTOXIC PAYLOAD

Highly potent agents

- targeting tubulin
- targeting **DNA**

Basic criteria

- amenability to conjugation
- solubility
- stability

Lee EK, Liu JFI, Gynecologic Oncology 2019 Stewart D, Cristea M, curr Opin Obstet Gynecol 2019 Fu Z et al. Signal Transduct Target Ther. 2022 Donaghy H et al. MAbs. 2016 Tang H et al. Front Pharmacol. 2019 Cheng X et al. Mol Cancer Ther. 2018 Chen H et al. Molecules. 2017 Chau CH, Steeg PS, Figg WD, Lancet 2019

Class	Mechanism of Action	Example compounds
Auristatins	Inhibit tubulin assembly	MMAE (vedotin) MMAF (mafadotin)
Maytansines	Inhibit tubulin assembly	DM1 : emtansine, mertansine DM4 : soravtansin, ravtansine
Tubulysins	Inhibit microtubule polymerization	AZ13599185
Pyrrolobenzo- diazepines (PBDs)	dimerization of PBD cause crosslinking of DNA	
Calicheamicin	induces double-strand DNA breaks	N-acetyl-g-calchicheamicin
Duocarmycins	alkylating agent	Seco-DUBA
Indolinobenzo- diazepines	alkylate only one strand of target DNA	
Camptothecin analogues	Inhibit DNA topoisomerase 1	Govitecan Deruxtecan

Payloads potency



Structure + Function of ADCs: DRUG TO ANTIBODY RATIO (DAR)

drug to antibody ratio (DAR) = number of drug molecules attached to the antibody

-> ADC potency and toxicity



Chau CH, Steeg PS, Figg WD, Lancet 2019 Stewart D, Cristea M, curr Opin Obstet Gynecol 2019 Lee EK, Liu JFI, Gynecologic Oncology 2019

	Ag	Payload	DAR
Mirvetuximab-Soravtansine	FRα	DM4	3-4
Anetumab-Ravtansine	Mesothelin	DM4	3.2
Tisotumab-Vedotin	TF	MMAE	NR
Lifastuzumab-Vedotin	NaPi2b	MMAE	3-4
Luveltamab-Tazevibulin (stro-002)	FRα	3-aminophenyl hemiasterlin	4
Farletuzumab-Ecteribulin (MORAb-202)	FRα	Eribulin	4
Upifitamab-Rilsodotin (UpRi)	NaPi2b	MMAF	10-12
DMOT4039A	Mesothelin	MMAE	3.5
BMS-986148	Mesothelin	Tubulysin	3
DMUC4064A	MUC16	MMAE	2

Dose / Payloads More is not always better



UPLIFT / ENGOT-OV67 / GOG-3048

Design: Single arm Phase II (continued out of Phase I trial)

α=0.025 (one-sided)

ORR 24% (vs 12% based on single agent

power = 90%

chemo)

Key inclusion criteria:		Primary endpoint	
 Platinum-resistant[®] HGSOC[®] 1–4 prior lines of therapy Prior bevacizumab required if patient 	UpRi 36 mg/m² up to max 80 mg; IV q4w	 Investigator-assessed confirmed ORR in NaPi2b-positive population 	UPLIFT
 received only 1–2 prior lines of therapy ECOG PS 0–1 	36 mg/m ² dose selected based on favorable safety	Secondary endpoints	
 Available archived or fresh tissue for retrospective NaPi2b evaluation 	profile and similar efficacy as dose Group 43 seen in the	Investigator-assessed confirmed ORR in	
 Grade ≤ 2 peripheral neuropathy Measurable disease per RECIST v1.1 	Phase 1b study	overall population DOR	ENGOT GOG FOUNDATION®
 Key exclusion criteria: 1-2 prior lines AND bevacizumab-naive 	Statistical Assumptions	Safety	European Network of Gynaecological Oncological Trial groups

UPIFITAMAB RILSODOTIN (UPRI; XMT-1536)



Primary platinum-refractory disease

Dolaflexin ADC designed to minimize the common toxicities associated with ADCs

(peripheral neuropathy, neutropenia, ocular toxicity)

Antibody: Humanized monoclonal anti-SLC34A2 (NaPi2b) Linker: Polymer scaffold; Stochastic cysteine conjugation Payload: AF-HPA - controlled bystander effect; highly potent antitubulin inhibitor selectively toxic to rapidly dividing cells Drug-to-Antibody Ratio: Heterogeneous; ~10

NCT03319628

^a Platinum-resistant is defined as disease that has progressed within 6 months of the last dose of platinum. HGSOC, including fallopian tube and primary peritoneal cancer. DOR, duration of response; ECOG PS, Eastern Cooperative Oncology Group performance status; ENGOT, European Network of Gynaecological Oncological Trial Groups; GOG, Gynecologic Oncology Group; HGSOC, high-grade serous ovarian cancer; IV, intravenous; NaPi2b, sodium-dependent phosphate transport protein 2B; ORR, overall response rate; g4w, every 4 weeks; RECIST, Response Evaluation Criteria in Solid Tumors: UpRi, upifitamab rilsodotin,

Richardson et al. IGCS 2022 Concinet al ESGO, 2024

UPLIFT / ENGOT-ov67 / GOG-3048

Upifitamab-Rilsodotin (UpRi)

High-DAR Sub-Populations are believed to have contributed to Off-Target Toxicities



Hypothesized that the high-DAR subpopulation may have reduced UpRi's efficacy while also increasing toxicity, including potentially thrombocytopenia and bleeding

Position payload, DAR (drug-antibody ratio), and linker technology ARE important



Examples of antigens exploited for ADC development in OC¹



Note: Some ADCs may only demonstrate efficacy in higher expression levels of the target antigen.^{2,3}

Chelariu-Raicu A, et al. Int J Gynecol Cancer. 2023
 Moore KN, et al. ESMO Annual Meeting. 2019; Presentation 992O
 Meric-Bernstam F, et al. J Clin Oncol. 2024

FRα

Examples of antigens exploited for ADC development in OC¹



Note: Some ADCs may only demonstrate efficacy in higher expression levels of the target antigen.^{2,3}

FRα has emerged as a very attractive candidate for molecularly targeted approaches in ADC development for OC due to its almost ubiquitous expression on the surface of HGSOC and its ability to internalize large molecules containing a cytotoxic payload

Chelariu-Raicu A, et al. Int J Gynecol Cancer. 2023
 Moore KN, et al. ESMO Annual Meeting. 2019; Presentation 9920
 Meric-Bernstam F, et al. J Clin Oncol. 2024

FRα is a transmembrane glycoprotein that facilitates the unidirectional transport of folate into cells via receptor-mediated endocytosis

- Folate binding to FRα creates a receptor-ligand complex¹
- Invagination and budding off into caveolae-type vesicles gives rise to early endosomes¹
- The endosomes undergo acidification and subsequent fusion with lysosomes, ultimately resulting in folate release¹
- Folate is required for the synthesis of DNA and RNA¹
 - Anti-folates, such has methotrexate, have long been used in the treatment of cancer²



FR, folate receptor. 1. Birrer MJ, et al. Oncologist. 2019;24(4):425-429. 2. Newman AC, et al. Br J Cancer. 2017;116(12):1499-1504.

Rationale for targeting FR α in ovarian cancer

$FR\alpha$ in ovarian tumours

- Expression varies by sub-type, e.g., a consortium-based analysis of data from 12 studies showed FRα expression in:²
 - **76%** of high-grade serous
 - 50% of low-grade serous
 - 32% of clear cell carcinomas
- Expression is retained in recurrent and metastatic tumours and is not significantly altered in response to chemotherapy³⁻⁵

FRα in non-malignant ovarian tissues

- FRα is scarcely expressed in nonmalignant ovarian tissues⁶
- Limited to polarized epithelia, such as in the choroid plexus, kidney, lung, and placenta^{3,7}
- FRα has a minimal physiological role in non-malignant tissues after embryogenesis⁶

FR, folate receptor; HGSOC, high-grade serous ovarian cancer; OC, ovarian cancer. 1. Chelariu-Raicu A, et al. Int J Gynecol Cancer. 2023;33(3):420-429. 2. Köbel M, et al. Br J Cancer. 2014;111(12):2297-307. 3. Birrer MJ, et al. Oncologist. 2019;24(4):425-429. 4. Despierre E, et al. Gynecol Oncol. 2013;130(1):192-9. 5. Rubinsak LA, et al. Appl Immunohistochem Mol Morphol. 2018;26(8):567-572. 6. Scaranti M, et al. Nat Rev Clin Oncol. 2020;17(6):349-359. 7. Elnakat H, et al. Adv Drug Deliv Rev. 2004;56(8):1067-84.

Mirvetuximab Soravtansin



anti-Folate R1 mirvetuximab soravtansine

MIRASOL STUDY

an open label, phase 3 randomized trial of MIRV vs investigators's choice chemotherapy in patients with FRα-high platinum-resistant ovarian cancer



Luveltamab Tazevibulin (STRO-002)

FRa-targeted ADC

in recurrent, epithelial ovarian cancer

Luveltamab tazevibulin



Phase 1 dose-expansion study (NCT03748186) ORR: 31.7% ORR 37.5% in FR α > 25% by TPS ****

4 pts had 0%

TPS

>25% ≤25%

Starting

Dose

Starting dose, Q3W

4.3 mg/kg

5.2 mg/kg

Efficacy



Safety

Phase 1 dose-expansion study

TRAEs leading to dose reduction in 61.4%

- Neutropenia^a in 17 patients (39%)
 - Primarily G3/4 uncomplicated (abnormal lab value only)
 - Febrile neutropenia in 2 patients (4.5%)
 - Resolved without growth factor support in most patients
 - Median duration of G3+ AEs, 8 days
- Arthralgia in 8 patients (18%) ٠
- Peripheral neuropathy in 3 patients (6.8%)
 - Most G1/2

TEAEs leading to dose discontinuation in 3 patients (6.8%)

- G3 fatigue
- G2 neuropathy
 - G5 Sepsis

Luvelta (STRO-002) is a homogenous ADC targeting FRα

Cathepsin B linker, which is a stable

protease-cleavable linker

Hemiasterlin-derivative^a cytotoxic payload

DAR=4

Currently moving to late phase trial

Dose

1. Oaknin et al. Poster presented at ASCO 2023; Abstract 5508. 2. Sutro Biopharma. Accessed March 2, 2023. https://www.sutrobio.com/wpcontent/uploads/2023/01/Sutro-STRO-002-Luvelta-update-Jan-9-2023-FINAL.pdf

Rinatabart sesutecan (Rina-S; PRO1184) *FRα-targeted ADC*

in recurrent, epithelial ovarian cancer

Rinatabart sesutecan (Rina-S; PRO1184)1,2



mAb: F131, proprietary human IgG1, rapidly internalizing, reduced FcγR binding (LALA mutation)

Linker-payload: LD038 sesutecan; proprietary hydrophilic linker, exatecan payload DAR 8 Antitumor Activity | OC – Dose Expansion

Rina-S showed encouraging antitumor activity at 120 mg/m²Q3W, including a complete response in patients with heavily pretreated OC

Efficacy1

	Ri	na-S	Best Change in Terret Legian in OC Dess Expansion			
OC Dose Expansion	100 mg/m² n = 22 ^b	120 mg/m² n = 18 ^b	Best Change in Larget Lesion in OC Dose Expansion	M		
Confirmed OPP 3/b %/ (05%/ CI)	18.2	50.0	1 jé 12 mpm ²	Ν		
Commed OKK, 7 /0 (35 /0 Cl)	(5.2-40.3)	(26.0-74.0)		ŀ		
Best overall response, ^b n (%)						
CR	0	1 (5.6)	5 41.01 9 41.01 9 41.01 9 41.01	L		
PR	4 (18.2)	8 (44.4)	5	F		
SD	15 (68.2)	7 (38.9)	ALC STATE			
PD	3 (13.6)	1 (5.6)	2 301 42 44 41 41 41 41 41 41 41 41 41 41 41 41	[
Not evaluable	0	1 (5.6)	60 (0) 61 (0) 62 (0)			
	86.4	88.9	0 8			
DCR, % (95% Cl)	(65.1-97.1)	(65.3-98.6)		I		
Median DOR (95% CI)	NR (I	NR-NR)	*Prior mirvetuximab soravtansine treatment	1		
Treatment duration, range: 3.0-42.0 Median on-study follow-up: 24 weeł	ent duration, range: 3.0-42.0+ weeks or-study follow-up: 24 weeks Median no. of cycles: 6.5 (100 mg/m ²) and 7.0+ (120 mg					

Phase 1 dose-expansion study

Safety1

nse,	Summary of Drug-Related TEAEs occurring in at least 10% of overall population – Part E					– Part B	
		100 mg/m ² (n=9*) n(%)			120 mg/m ² (n=9) n(%)		
nansion		Any	G3	G4	Any	G3	G4
Dose Level	Nausea	4 (44.4)			4 (44.4)		
120 mg/m²	Neutropenia	2 (22.2)	1 (11.1)		5 (55.6)	1 (11.1)	2 (22.2)
	Anemia	2 (22.2)	1 (11.1)		4 (44.4)	2 (22.2)	
44 44) 44) 45 45 45 45 45 45 45 45 45 45 45 45 45	Leukopenia	2 (22.2)			4 (44.4)	1 (11.1)	
	Fatigue	3 (33.3)	1 (11.1)		2 (22.2)		
	Diarrhoea	2 (22.2)			2 (22.2)		
	Thrombocytopenia				4 (44.4)	1 (11.1)	1 (11.1)
-42.6	Malaise				3 (33.3)	1 (11.1)	
ne treatment ^c	Vomiting	1 (11.1)			2 (22.2)		

^aCI calculations: ORR, DRC–Clopper-Pearson's exact method; PFS, OS–Kaplan-Meier estimate and Greenwood formula.

ADC, antibody-drug conjugate; CI, confidence interval; CR, complete response; DAR, drug-to-antibody ratio; DCR, disease control rate; FRα, folate receptor alpha; Gr, grade; HGS, high-grade serous; ILD, interstitial lung disease; mOS, median overall survival; mPFS, median progression-free survival; NE, not estimable; ORR, objective response rate; OS, overall survival; PD, progressive disease; PFS, progression-free survival; PR, partial response; SD, stable disease; TEAE, treatment-emergent adverse event.

1. E.K. Lee¹, O. Yeku², I. Winer³, E.P. Hamilton⁴, D.L. Richardson⁵, J. Zhang⁶, G.E. Konecny⁷, I.C. Anderson⁸, X. Wu⁹, D. Orr¹⁰, S. Patel¹¹, A. Jewell¹², J. Wang¹³, A.I. Spira¹⁴, A. Melnyk¹⁵, L. Seamon¹⁶, E. Kavalerchik¹⁷, Z. Chen¹⁸, E. Song¹⁷, J.A. Call¹⁹ ESMO 2024

Patient selection for the FRα-targeting therapy with MIRV: characterization of folate receptor alpha (FRα) expression

Representative low, medium, and high staining patterns for FR α from archival tumour specimens¹



Figure adapted from Martin LP, et al.¹

Prevalence of PS2+ FRα expression in 2,869 pooled samples from patients with HGSOC²



Figure adapted from Deutschman E, et al.² with a modified layout.

FRα, folate receptor alpha; HGSOC, high-grade serous ovarian cancer; MIRV, mirvetuximab soravtansine; PS2+, positive staining intensity ≥2. 1. Martin LP, et al. Gynecol Oncol. 2017;147(2):402-407. 2. Deutschman E, et al. 36th European Congress of Pathology (ECP). 2024; Abs 2093 and poster.

Comparison of the Ventana FOLR1 (FOLR1-2.1) CDx assay vs other IHC research assays for FRα detection in FFPE samples

Correlation plot between the FOLR1 CDx

and Biocare-intelliPATH assays

Correlation plot between the FOLR1 CDx and Leica-Link48 assays



Percentage agreement with the FOL1 CDx assay

	Positive	Negative	Overall
Leica-Link48 assay	100	60	71
Biocare- intelliPATH assay	86	74	77

Figures adapted from Deutschman E, et al.¹

Authors' conclusions:

• These data highlight the **need for caution in antibody selection** when developing IHC-based assays, as some antibodies failed to identify FRα cleanly and specifically

100

 The Ventana FOLR1 (FOLR1-2.1) CDx assay should be used during patient selection for the FRα-targeting therapy MIRV
 CDx, companion diagnostic; FFPE, formalin-fixed paraffin-embedded; FOLR1 or FRα, folate receptor alpha; IHC, immunohistochemical; MIRV, mirvetuximab soravtansine; PS2+, positive staining 2+.

1. Deutschman E, et al. 36th European Congress of Pathology (ECP). 2024; Abs 1566 and poster.

FORWARD I



PS2+ Scoring

- In all prior studies, PS2+ scoring was used to assess FRa expression
- Eligibility determined by staining intensity and percentage of tumor cells staining at 0, 1+, 2+, or 3+





10X Scoring

- In FORWARD I, a simplified scoring method to assess FRa expression was implemented
- Eligibility was determined by scoring just the percentage of cells with membrane staining by <10X magnification, without regard to intensity

10X Scoring Positive: ≥ 50% of tumor cells with FRα membrane staining visible at 10X microscope objective



Bridging study indicated that 10X scoring was sufficient for patient selection Exploratory analyses suggest that the change in scoring method from PS2+ to 10X introduced a population of patients into FORWARD I with lower levels of FRα expression than intended

Key takeaways

ADCs an exciting new class of drugs, which are COMPLEX

many ADCs in clincila development with different antibodies, targets, linkers and payloads

All great opportunites come with challenges/questions

- Which ADC to choose?
- How much target/biomarker is needed?
- What is the best cut-off (if any)?
- Intra- and intertumoral heterogeneity
- What is the best assay?
- How to sequence?
- Apply in which setting (treatment line or maintenance)?
- Adverse event profile?
- Possible combinations with other drugs?

We are learning through experience some ADCs will succeed, some will fail

First approval of ADC in Gynae Onc in Europe:

Mirvetuximab Soravtansine in platinum-resistant ovarian cancer





Scientific Programme Chair Isabelle Ray-Coquard



ESGO+Congress president Anna Fagotti

ROME ESGO congress 20-23 February 2025

Jubilee 2025



