

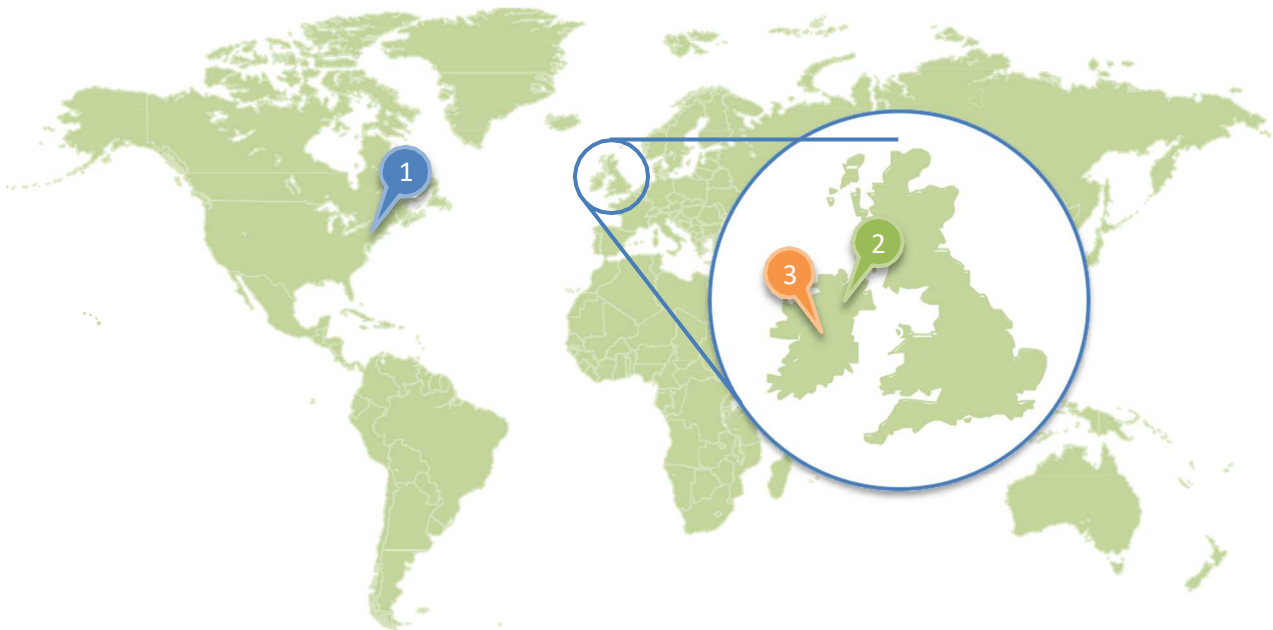
Equipment List

Analytical Services

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Location of sites



1.	Almac Sciences LLC, Souderton, Pennsylvania, United States	3
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1. Almac Sciences LLC, Souderton, Pennsylvania, United States

1.1 Analytical equipment (cGMP)

Technique	Instruments	Features	Numbers
Chromatography (HPLC)	Agilent 1200 HPLC systems	UV, CAD, RID Detectors	3
Chromatography (HPLC)	Agilent 1260 HPLC system with various detectors (PDA, VWD, CAD, RID)	PDA, UV, CAD, RID) Detectors	7
Chromatography (UPLC)	Agilent 1290 UPLC system with VWD	UV Detectors	1
Chromatography (HPLC)	Waters Alliance HPLC	UV Detectors	2
Chromatography (UPLC)	Waters H-Class systems	UV and PDA Detectors	3
Liquid Chromatography Mass Spectrometry	Waters H Class with QDa	Low resolution LC/MS	1
Chromatography (GC)	Agilent 7890A Agilent 7693 Auto sampler, headspace	FID Direct Inject and Headspace	2
Dissolution	Distek Evolution 6100 Dissolution Baths	Paddles and Baskets	7
Dissolution	Distek Evolution 6300 Dissolution Bath	Paddles and Baskets	1
Dissolution	Evolution 4300 Autosampler with dual pumps		4
Dissolution	Sotax ATMD Robot	Automated Paddles and Baskets with Camera Monitor	1
Disintegration	VanKel 100	Disintegration Testing	1
Infrared spectroscopy (FTIR)	Perkin Elmer Spectrum 100 FT-IR with ATR, DRIFT, Transmission		1
Ultraviolet-visible spectroscopy (UV-Vis)	Perkin Elmer Lambda 35 UV/VIS spectrophotometer		1
Water Content	Mettler C30 Coulometric Karl Fisher titrator	Karl Fischer coulometry, Stromboli oven	1
Water Content	Mettler V30 Volumetric Karl Fisher titrator	Karl Fischer volumetric titrator	1
Water Content	Metrohm 874 / 851	Karl Fischer coulometry, Stromboli oven	1

Concentration	Metrohm 888	Potentiometric titrator	1
Density	Mettler Densito	Density Meter	1
Melting Point	Buchi M-565	Melting Point Testing	1

2. Almac Sciences Ltd, Craigavon, Northern Ireland, United Kingdom

2.1 Analytical equipment (cGMP)

Technique	Instruments	Features	Numbers
X-ray powder diffraction (XRPD)	Panalytical Xpert Pro MPD Pixcel detector	Reflection, transmission, variable temperature, auto-sampling	1
X-ray powder diffraction (XRPD)	PANalytical Aeris Research Edition	Reflection, transmission, variable temperature, auto-sampling	1
X-ray powder diffraction (XRPD)	PANalytical Empyrean with pixel detection	Reflection, transmission, well plates, variable temperature, auto-sampling	1
Differential scanning calorimetry (DSC)	Perkin Elmer DSC 6000	Sub-ambient, auto-sampling	1
Hyper DSC	Perkin Elmer 8500 DSC		1
Thermogravimetric analysis (TGA)	Mettler Toledo STARe	Simultaneous DSC & TGA	1
Dynamic vapour sorption (DVS)	Hidden Isochema IGAsorp	Aqueous and organic vapour	1
Particle size analysis	Malvern Mastersizer 3000 Sympatec Helos	Wet and dry dispersion	2
Intrinsic dissolution	Distek Evolution 6300	Modified for small samples	1
Infrared spectroscopy (FTIR)	Thermonicolet Avatar 370 Perkin Elmer Spectrum RX1	ATR golden gate	2
Ultraviolet-visible spectroscopy (UV- vis)	Analytik Jena, Specord 200 & Hitachi U-2001		2
Nuclear magnetic resonance (NMR)	Bruker Advance NEO 500MHz Ultrashield NMRs	Prodigy BBO Cryoprobes	2
Chromatography (HPLC)	Waters Alliance	RI, CAD, ELSD and radio detectors ion and size exclusion systems large prep scale capabilities	50
Chromatography (UHPLC)	Waters H-Class	PDA and UV visible coupled with mass spectrometry	27
Chromatography (HPLC)	Agilent 1260	CAD, ion and size exclusion systems large prep scale capabilities	20
Chromatography (UHPLC)	Agilent 1290	PDA and UV visible coupled with mass spectrometry	10

Chromatography (GC)	Agilent 7890/8890	ECD, TCD and FID detectors Headspace systems	8
Liquid Chromatography Mass Spectrometry High Resolution	Agilent 6530 LC-Q-TOF Agilent 6230 LC-TOF Thermo Scientific Orbitrap Q-Exactive	LC-MS ⁿ capabilities, accurate mass, Sources include ESI, APCI, ASAP	3
Liquid Chromatography Mass Spectrometry	Agilent 6460 LC-Triple Quad, Waters QDa	LC- MS ⁿ and MS/MS ⁿ capabilities	2
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	Agilent 7900 Thermo Scientific iCAP Q	Elemental analysis and assay analysis	2
Gas Chromatography Mass Spectroscopy	Agilent 7890/5975 Agilent 8890/5977	Simultaneous FID and MS analysis, liquid and headspace sample capabilities, Thermal Separation Probe. MS ⁿ capabilities, ALS, Headspace and solids probe	2
Ion Chromatography	Dionex, ICS-5000 and IC-6000	Conductivity and electrochemical detectors	5
Dissolution	Distek	USP apparatus I and II	8
Water content	Mettler Toledo DL39, C30, V30	Karl Fischer coulometry & titrometry, Stromboli oven	8
Water Content	Metrohm 874 / 851	Karl Fischer coulometry, Stromboli oven	3
Polarimetry	Perkin Elmer 341		1
Autotitrator	Mettler Toledo T70, T7		2
Stability testing	All ICH zones	Large humidity chambers	> 300 capacity
TA Discovery	TGA Instrument		1

2.2 Analytical equipment (non-GMP)

Technique	Instruments	Features
Microscopy	Smiths IlluminatIR Olympus BX51 Linkam hot-stage Keyence microscope	From 10 – 200X, polarizing filters, digital image capture, ATR & ARO objectives, -196 to 350°C, linked to FTIR
Raman spectroscopy	Perkin Elmer RamanMicro 200F series Raman Microscope Avalon RamanStation Fusion R1	Microscopy and mapping capabilities
Automated solubility determination	Clarity crystallisation station Crystal 16 unit	Multi well reactor block with turbidity probes
Crystallisation development	Jacketed glass reactors (100mL – 20L) HEL polyBLOCK 4	Development of robust crystallization procedures with on-line particle size (cord)

	BlazeMetrics 900 probe with Raman spectrophotometer	length) distribution, morphology and polymorph monitoring
Formulation development	Freeze dryer Spray dryer High shear mixing (Ultra Turrax) Rotary evaporators (Buchi) Ball mill (Retsch)	Development of stabilised amorphous formulations
Software modelling tools	ACDLabs Percepta Dynochem suite Mercury HighScore Plus JMP 16	pKa, log P, solubility modelling, crystal structure visualisation, unit cell indexing Olexsys for crystal structure determination pKa, IDR, biphasic dissolution, pH solubility profile – controlled supersaturation
Bulked/tapped Density	Vankel tapped density meter	powder flow
FT-IR	Agilent FT-IR	ATR accessory

3. Almac Sciences Ireland Ltd, Athlone, Ireland

3.1 Analytical equipment (cGMP)

Description	Instrument	Features	Count
ICH stability storage	-80°C freezers		3
	20°C freezers		3
	5°C refrigerated storage		8
	25°C/60%RH long term stability storage		3
	40°C/75%RH accelerated stability storage		1
	Sciex (X2) API 4000		2
	Sciex API 4000 QTRAP		1
Chromatography	HPLC Waters	RI and Fluorescence detection	2
	HPLC Waters	UV/Vis detection	3
	HPLC Waters	Fluorescence and PDA detection	1
	HPLC Waters	PDA and UV/Vis detection	1
	HPLC Shimadzu LC20 Prominence	UFLC XR	1

	HPLC Shimadzu LC20 Prominence	UFLC	1
	Agilent Technology	1290 Infinity II	2
	UPLC Waters H-Class	TUV detection	3
	UPLC Waters H-Class	TUV and PDA detection	1
	UPLC Waters H-Class	TUV, ELSD and Fluorescence detection	1
	UPLC Waters H-Class (Binary)	TUV	1
	UPLC Waters Acquity Premier	TUV	1
	GC Agilent 7890A	FID Detection	1
	GC Agilent 6890	FID Detection	1
	GC Agilent 7890B	FID Detection	1
	GC Agilent 8890	FID Detection	1
	Agilent Headspace	G1888	2
	Agilent Headspace	7697A	2
	Dani Headspace	86.50 Plus	1
	GC Hewlett Packard 6890	FID detection	1
	Sykam S433 Amino acid analysers	Visible Range and UV/Vis detection	2
Spectroscopy	Molecular Devices Spectramax Abs Plus		1
	FT-IR Bruker Alpha-P		1
	FT-IR Thermo Scientific	Nicolet iS5	1
	UV-Vis Shimadzu	UV-2600	1
	SoloVPE from C-Technologies (Slope Spectroscopy)		1
Electrophoresis	BioRad TransBlot Turbo (Western Blots)		1
	BioRad Tetra cell (SDS-PAGE, Native PAGE, 2-D PAGE, DGGE, Gel IEF)		1
	Sciex PA 800 Plus (CE-SDS, CIEF, CZE)		1
	Maurice OBM – Protein Simple (CIEF, CE-SDS)		1
qPCR	Thermo 7500 Fast RT-PCR		1
Drug product analysis	Dissolution baths Agilent	708-DS	2
	Dissolution baths Distek	Dissolution System 2100C	2
	Disintegration bath Caleva Dist 2		1
Particle size	Shimadzu SALD-2201		1

distribution	Malvern (ZSP Nano series) ZEN5600		1
Bacterial Identification system	Biolog Micro station - identification of Bacterial Isolates <ul style="list-style-type: none"> • Gram positive Rods • Gram Positive cocci • Gram negative rods. 	ELx8008BLG	1
Micro	Memmert Incubator INE 800	30-35°C	1
	Memmert Incubator IFE 600	42-44°C	1
	Memmert Incubator INE 600	35-37°C	1
	Memmert Incubator INE 600	30-35°C	1
	Memmert Cooled Incubator IPC450	20-25°C	1
	Memmert Cooler Incubator WTW TS 606/4i	20-25°C	1
	Laminar flow unit BASSAIRE	P5VB	2
	Biohazard safety cabinet SCANLAF	Class II	1
	Light Microscope OPTICA	x100-x1000	1
	pH – Meter METTLER Toledo	Seven Compact	1
Endotoxin	Pyros [®] EQS v 1.2, Pyros Kinetic [®] Flex System		2
Particle Counter	Beckman Coulter HRLD150		1
Osmometer	Osmol 1 TM Single Sample Micro Osmometer (Advanced Instruments)		1
Other technologies	Perkin Elmer 2470 Wizard2 (Gamma counter)		1
	Perkin Elmer Filtermate (Cell harvester)		1
	CEM Technologies Mars6 (Microwave assisted digester)		1
	AA with flame and graphite furnace	Agilent 200 Series AA	1
	Metrohm Kark Fischer	Coulometric 851 Titrando	1
	Metrohm Kark Fischer	Volumetric 890 Titrando	1
	Mettler Toledo T70 Auto-Titrator		1
	Metrohm Auto-Titrator	888 Titrando	1
	Colorimeter	Lovibond Comparator 2000 Plus	1
	Refractometer	Bellingham + Stanley RFM970	1
	Polarimeter	Bellingham + Stanley ADP440	2
	Melting Point	Thermo Scientific 9100	1