

Medical & Bio

Market Mood

Field Intelligence Report

78

Vol. 48 | 2026.06.22 — 06.28 | Articles: 92

/ 100 Optimistic

Cell Culture Technology / iPSC & Regenerative Medicine / Drug Discovery & DDS / Biosensors

AI & Advanced Biologics Drive 2026 Medical Innovation

Breakthroughs in cell therapies, gene editing, and smart diagnostics accelerate patient access and reshape R&D; pipelines.

Cell & Gene Therapy Market Growth	AI in Drug Discovery Adoption	Bioprocessing Cost Reduction	Biosensor Market Expansion
25-30%	30%+	20-30%	15-20%
+5%	+10%	+5%	+3%

Weekly Summary

The Medical & Bio domain is experiencing rapid transformation, driven by AI integration across drug discovery and bioprocessing, alongside significant advancements in cell and gene therapies. Allogeneic iPSC-derived treatments are gaining traction, promising scalability and cost reduction. Precision drug delivery systems, including exosomes and microrobots, are enhancing therapeutic efficacy, while next-gen biosensors are revolutionizing diagnostics and real-time monitoring. Western players must leverage AI, secure IP in gene editing, and invest in automated manufacturing to maintain global competitiveness amidst evolving regulatory landscapes and increasing Asian market participation.

4 Sub-Topic Summary

Sub-Topic	Headline	Momentum	Key Insight
Cell Culture Technology	Bioprocessing Innovations Drive 5x Productivity Gains, Reduce Costs	Accelerating	Next-gen cell culture technologies, including single-use bioreactors, advanced media, and PAT like Raman spectroscopy, are boosting productivity by 5-6 fold and reducing manufacturing costs by 40-60% for cell and gene therapies.

iPSC & Regenerative Medicine	CRISPR & iPSC Therapies Advance with 87% Efficacy, \$1.1B Investment	Accelerating	CRISPR-based gene editing therapies like Intellia's lonvo-z show 87% efficacy in Phase 3, while iPSC-derived allogeneic CAR-T and base editing therapies are progressing rapidly, attracting \$1.1 billion in automated manufacturing investment.
Drug Discovery & DDS	AI Accelerates Drug Discovery, Oral GLP-1 Achieves 12% Weight Loss	Building	AI-driven platforms are accelerating drug discovery, with AI-designed candidates entering Phase 1/2 trials. Oral GLP-1 agonists like aleniglipron show 12% weight loss in Phase 2, while novel DDS strategies, including exosomes, target 'undruggable' conditions.
Biosensors	Smart Biosensors & AI Microrobots Revolutionize Diagnostics, Drug Delivery	Accelerating	AI-guided microrobots enable spatiotemporally controlled drug release, enhancing tumor therapy, while advanced biosensors like CGMs and wearable aptamer sensors provide real-time, ultra-sensitive diagnostics for diabetes and stress monitoring.

Daiichi Sankyo Reassesses ADC Manufacturing, Cancels In-House Expansion

Source: TDnet/ , Company Tech News (Gemini Grounding)

Summary: Daiichi Sankyo reported ¥133.2 billion (\$850 million) in temporary expenses for fiscal year 2025, attributed to a reassessment of demand for its Antibody-Drug Conjugates (ADCs). This led to the cancellation of a planned expansion of in-house manufacturing capa...

WHY ENGINEERS SHOULD CARE

This signals a strategic shift in high-value biologic manufacturing, potentially impacting demand for specialized bioprocessing equipment, cleanroom facilities, and automation systems. Procurement tea...

AMED Boosts iPS Cell Research with New Funding for Drug Discovery & Regenerative Medicine

Source: Govt / Research / Press Releases (Gemini Grounding)

Summary: The Japan Agency for Medical Research and Development (AMED) announced the adoption of several "Regenerative, Cell, and Gene Therapy Acceleration Program" projects. These include "team-type" projects receiving up to ¥13 million annually for research and ¥20 mi...

WHY ENGINEERS SHOULD CARE

This significant government investment (up to ¥33 million per team project annually) will drive demand for advanced laboratory automation, high-throughput screening systems, AI-powered computational d...

Regenero Secures ¥1.22 Billion for iPS-Derived Kidney Therapies

Source: PR Times / (Gemini Grounding)

Summary: Japanese biotech firm Regenero completed a first close of ¥1.22 billion (\$7.8 million) in strategic funding, aiming for a total of ¥1.7 billion. This capital will accelerate the development of its iPS cell-derived therapies, including RN-014, an iPS-derived sm...

WHY ENGINEERS SHOULD CARE

The advancement of iPS-derived small molecules and cell therapies signifies a growing need for specialized manufacturing equipment for cell culture, purification, and quality control. Semiconductor an...

This Week's Japan Technology Highlights

Japan's biotech: Daiichi Sankyo canceled ¥133.2B ADC manufacturing expansion. AMED boosted iPS cell research with ¥33M annual funding, signaling biologics production shifts and R&D growth.

China Watch | Medical & Biotech

Full English content available after pipeline regeneration.

China's Advanced Biologics Pipeline: ADCs and Multispecific Antibodies Show Global Ambition

■ China's Move

CStone Pharmaceuticals initiated a global Phase I clinical trial for its EGFR/HER3 bispecific ADC candidate, CS5007, following Australian HREC approval on June 12, 2026. Preclinical data for CS5007, presented at AACR in April 2026, demonstrated broad antitumor...

■ Technical Verification

[CONFIRMED]

CStone's CS5007 global Phase I trial has commenced with ethics approval in Australia. / Preclinical data for CS5007 demonstrated broad antitumor activity in specific challenging models.

[BOTTLENECK]

Translating promising preclinical and early-phase clinical data for complex biologics like bispecific ADCs into successful late-stage trials and scalable, cost-effective GMP manufacturing with consist...

■ Implications for Western Engineers

- R&D teams should closely monitor clinical progress and detailed efficacy/safety profiles of Chinese-developed next-gen ADCs (e.g.,...
- Drug discovery groups should analyze the target selection (EGFR/HER3, FRa) and ADC design strategies employed by Chinese firms for...
- Clinical development planners should assess the speed and efficiency of Chinese firms in initiating global clinical trials, partic...

Key Trends This Week (5 Total)

TR-01 HIGH

Cross-Domain

AI & ML Drive 30% Efficiency Gains in Drug Discovery & Bioprocessing

AI and machine learning are becoming indispensable, accelerating drug discovery from target identification to clinical trials, optimizing bioprocesses for 20-30% energy reduction, and enhancing diagnostic accuracy with smart biosensors.

AI/ML is transforming biopharma by streamlining protein design, predicting molecular behavior, and enabling proactive decision-making in manufacturing. This integration is crucial for reducing development timelines and costs, while also powering next-gen diagnostics and precision drug delivery systems.

Energy Reduction

20-30%

AI-designed candidates

Multiple in Phase 1/2

► Samsung Biologics ► IBM ► Vertex AI Search ► Iambic Therapeutics ► Immunai

Refs: S1-15 S1-16 S1-21 S2-07 S2-32 S3-05 S3-07 S3-17 S3-20 S4-01 S4-05 S4-12

TR-02 HIGH

Cross-Domain

Allogeneic CGTs Achieve 40-60% Cost Reduction, Sub-7-Day Manufacturing

Allogeneic iPSC-derived and gene-edited CAR-T therapies are overcoming autologous limitations, achieving 40-60% cost reductions and sub-7-day manufacturing, expanding access to cancer and autoimmune treatments.

The shift towards 'off-the-shelf' allogeneic cell and gene therapies is driven by advancements in iPSC technology, genomic engineering, and automated manufacturing. These innovations promise greater scalability, reduced costs, and faster patient access, addressing critical bottlenecks in advanced therapeutic production.

Cost Reduction

40-60%

Manufacturing Time

Under 7 days

► TreeFrog Therapeutics ► Quell Therapeutics ► Applied StemCell ► Fate Therapeutics ► Caribou Biosciences

Refs: S1-01 S1-06 S1-11 S1-13 S1-22 S1-23 S2-08 S2-09 S2-11 S2-16 S2-17 S2-18

TR-03 MED

Drug Discovery & DDS

Exosomes & Microrobots Enhance Targeted Drug Delivery, BBB Penetration

Engineered exosomes and AI-guided microrobots are revolutionizing drug delivery by precisely targeting tissues, breaching the blood-brain barrier, and minimizing off-target effects for complex diseases.

Innovations in drug delivery systems, particularly exosome-based platforms and magnetic microrobots, are enabling unprecedented precision. These technologies offer solutions for challenging targets like brain tumors and diabetic skin infections, promising enhanced therapeutic efficacy and reduced systemic toxicity.

BBB Penetration

Bladder Tumor Efficacy

Achieved

Significantly enhanced

► Novartis ► Antares Therapeutics ► RQ Bio ► Ionis Pharmaceuticals ► Boehringer Ingelheim

Refs: S2-15 S2-19 S2-22 S2-25 S3-06 S4-01 S4-03

TR-04 MED

Cross-Domain

FDA Approvals Surge, HHS Aims to Restore US Clinical Trial Leadership

A surge in FDA drug approvals (24 in May 2026) and new HHS initiatives to accelerate US drug discovery signal a dynamic regulatory environment, while global clinical trial transparency improves.

Regulatory bodies are adapting to accelerate advanced therapies, with designations like RMAT and evolving frameworks for gene editing. Concurrently, efforts are underway to enhance clinical trial efficiency and transparency, and to re-establish US leadership in drug development, countering shifts to other regions.

FDA Approvals (May 2026)

24 drugs

Biotech CEOs anticipating funding rebound

62%

► FDA ► HHS ► ClinicalTrials.gov ► PMDA ► European Medicines Agency

Refs: S1-02 S1-10 S1-12 S2-03 S2-21 S2-30 S2-33 S3-02 S3-03 S3-04 S3-05 S3-09 S3-16 S3-19

TR-05 LOW

Biosensors

Next-Gen Biosensors & POCT Drive Preventive, Personalized Healthcare

Continuous Glucose Monitors (CGMs) expand to Type 2 diabetes, while wearable aptamer sensors and Point-of-Care Testing (POCT) solutions offer real-time, ultra-sensitive diagnostics for proactive health management.

The integration of advanced biosensors, including CGMs, continuous ketone monitors, and wearable devices, is shifting healthcare towards preventive and personalized models. These technologies, supported by miniaturization and AI, enable early detection, real-time monitoring, and rapid on-site diagnostics, improving patient outcomes across various conditions.

Cortisol Sensor Stability

93.4% over 56 days

Screwworm Detection

15 minutes

► Dexcom ► Abbott ► Eversense ► Roche Diagnostics ► University of Oxford

Refs: S4-04 S4-05 S4-06 S4-08 S4-09 S4-10 S4-11 S4-13 S4-14

Macro Market Indicators

Indicator	Direction	Value	Note	Source
FDA Drug Approvals (May 2026)	↑	24 drugs	Highest number of approvals in a single month this year.	S3-03
Automated Cell Therapy Manufacturing Funding	↑	\$1.1B	Across 34 funding rounds, reflecting strong investor confidence.	S2-11
US Clinical Trial Leadership Initiative	↑	Launched	HHS initiative to restore domestic leadership, leveraging AI/ML.	S3-05, S3-09
Regulatory Framework Evolution	→	Evolving	ICH Q13, FDA RMAT, and Japan's Regenerative Medicine Law support advanced therapies.	S1-02, S1-10, S2-21

Macro Environment Summary

The biopharmaceutical sector is experiencing a robust period of innovation and strategic realignment. The FDA approved 24 drugs in May 2026, signaling a strong pipeline, while \$1.1 billion in funding for automated cell therapy manufacturing underscores investor confidence. The U.S. Department of Health and Human Services (HHS) has launched initiatives to restore domestic clinical trial leadership, leveraging AI/ML to enhance efficiency and safety. Concurrently, global regulatory frameworks, including ICH Q13 and Japan's Regenerative Medicine Law, are evolving to support advanced therapies, creating a dynamic environment for accelerated drug development and market access.

Market Data: IBB (Biotech) Weekly Trend

187.36 USD +7.92%

Action Recommendations by Player

Action Recommendations for Western OEM

OEM Novartis, Pfizer, Bristol Myers Squibb, Biogen, Vertex Pharmaceuticals

Western OEMs are actively integrating advanced therapies, with companies like Vertex AI-designed candidates entering Phase 1/2 trials and Novartis acquiring RNA therapeutics. The expansion of CAR-T to autoimmune diseases and solid tumors presents significant new product opportunities.

Risk

- If Asian CDMOs dominate allogeneic CGT manufacturing, Western OEMs face 12-18 month supply chain delays
- Failure to secure IP in gene editing technologies will lead to licensing costs and competitive disadvantages
- Slow adoption of AI/ML in R&D; will result in 24-36 month longer drug development cycles

Opportunity

- Acquire promising AI-driven drug discovery platforms to shorten R&D; by 1-2 years, targeting \$50B+ market by 2030
- Invest in allogeneic CAR-T and iPSC-derived therapies to capture \$30B+ market by 2030, reducing per-patient costs by 40-60%
- Partner with biosensor developers to integrate real-time diagnostics into therapeutic offerings, enhancing patient outcomes and market share

Actions This Week

- Evaluate 3-5 AI drug discovery platforms by Q4 2026 for potential acquisition or strategic partnership
- Initiate discussions with 2-3 leading allogeneic cell therapy CDMOs by end of this week to secure future manufacturing slots
- Form a cross-functional team by Q3 2026 to assess integration of advanced biosensors into existing product lines

□ Scenario: If AI-driven drug discovery accelerates competitor pipelines by 18 months, then Western OEMs must acquire or deeply partner with AI platforms by Q4 2026 to avoid significant market share erosion.

□ Quick Win : Schedule a strategic review by next Friday on integrating AI/ML into early-stage drug discovery, focusing on 20-30% efficiency gains.

Action Recommendations for Western Contract Manufacturer

CDMO/CRO Lonza, Minaris, Thermo Fisher Scientific, Sartorius, Oxford Biomedica

Western CDMOs are expanding GMP capabilities, with Minaris enhancing cell banking and Sartorius broadening integrated services. However, tacit knowledge loss during tech transfer remains a critical challenge impacting yield and quality.

Risk

- Failure to adopt advanced PAT and automation will lead to 15-20% higher operational costs than Asian competitors
- Loss of tacit knowledge during tech transfer will result in 10-15% yield reduction and quality issues for complex CGTs
- Insufficient investment in single-use bioreactors and closed-loop systems will limit capacity for next-gen therapies

Opportunity

- Invest in AI-driven bioprocess optimization to achieve 20-30% energy reduction and maximize asset utilization for clients

- Develop specialized expertise in allogeneic iPSC and gene-edited cell therapy manufacturing to capture \$30B+ market by 2030
- Offer integrated cell line development-to-GMP services to streamline client pipelines and secure long-term contracts

■ Actions This Week

- Implement a knowledge management system by Q3 2026 to formalize tacit process know-how and improve tech transfer success rates by 20%
 - Allocate Q4 2026 budget for evaluating 2-3 AI-enabled bioprocess optimization solutions for pilot implementation
 - Expand single-use bioreactor capacity by 15% within 12 months to meet growing demand for CGT manufacturing
- Scenario: If tacit knowledge loss continues to impede tech transfer, then Western CDMOs must invest in robust digital twin and AI-driven process control systems by Q1 2027 to ensure consistent product quality and client retention.
- Quick Win : Conduct an internal audit of current tech transfer protocols by end of this week, identifying 3-5 critical tacit knowledge gaps.

Action Recommendations for Western T&M; Provider

T&M; Thermo Fisher Scientific, Sartorius, Teradyne, NI, Bureau Veritas

Raman spectroscopy is emerging as a key PAT for real-time metabolite monitoring in bioprocessing, aligned with ICH Q13 guidelines. Long-read DNA sequencers are crucial for CAR-T genomic evaluation and quality control.

■ Risk

- Failure to develop PAT solutions for novel modalities (e.g., exosomes) will lead to market share loss to specialized competitors
- Lack of interoperability with diverse bioprocessing equipment will hinder adoption of integrated monitoring solutions
- Inability to provide real-time, in-line data will make Western T&M; providers less competitive against AI-driven analytics

■ Opportunity

- Develop integrated PAT solutions for continuous bioprocessing, targeting 15-20% efficiency gains for CDMOs by 2028
- Expand long-read DNA sequencing services for cell & gene therapy quality control, capturing a \$5B+ market by 2035
- Partner with biosensor developers to offer comprehensive diagnostic and monitoring platforms for personalized medicine

■ Actions This Week

- Launch a pilot program by Q4 2026 to integrate Raman spectroscopy with 3-5 leading single-use bioreactor systems
 - Invest in R&D; for long-read DNA sequencing capabilities, targeting CAR-T genomic evaluation by Q2 2027
 - Engage with 2-3 AI/ML analytics providers by Q3 2026 to develop predictive maintenance and quality control solutions
- Scenario: If bioprocessing shifts entirely to continuous manufacturing by 2030, then Western T&M; providers must offer fully integrated, real-time PAT solutions by 2028 to remain relevant and competitive.

Quick Win : Review ICH Q13 guidelines this week and identify 2-3 immediate PAT integration opportunities for existing product lines.

Action Recommendations for Western Material Supplier

Material BASF, Dow, DuPont, Umicore, Lonza (media division)

Advanced culture media, including serum-free and chemically defined formulations, are crucial for cellular agriculture and CGT manufacturing, boosting reproducibility and reducing contamination risks.

Risk

- Reliance on traditional materials will lead to obsolescence as bioprocessing shifts to single-use and chemically defined systems
- Failure to develop GMP-compliant, low-immunogenicity materials will hinder adoption in allogeneic cell therapies
- Supply chain disruptions for critical raw materials will impact manufacturing stability and client relationships

Opportunity

- Develop and commercialize serum-free, chemically defined media for cellular agriculture and CGT, targeting a \$2B+ market by 2028
- Innovate in biomaterials for 3D bioprinting and organ-on-chip devices, supporting advanced drug screening platforms
- Supply GMP-compatible hypoimmune iPSC lines and viral vector components for scalable allogeneic therapies

Actions This Week

- Allocate R&D; budget by Q4 2026 to develop 2-3 novel serum-free media formulations for iPSC expansion
- Initiate partnerships with 1-2 leading 3D bioprinting companies by Q1 2027 to co-develop specialized bio-inks
- Conduct a supply chain risk assessment by Q3 2026 for critical raw materials used in advanced bioprocessing

Scenario: If the demand for allogeneic iPSC therapies doubles by 2028, then Western material suppliers must secure GMP-compliant, low-immunogenicity iPSC lines and media by Q4 2027 to meet market needs.

Quick Win : Contact 2-3 cellular agriculture startups this week to understand their specific needs for advanced, serum-free culture media.

Action Recommendations for Western Distributor

Distributor Arrow Electronics, Avnet, Brenntag, VWR International, Fisher Scientific

Distributors play a crucial role in ensuring the timely supply of specialized reagents, single-use components, and advanced instruments for biopharmaceutical R&D; and manufacturing, particularly for emerging markets.

Risk

- Increased direct sourcing by large biopharma will reduce distributor margins and market relevance
- Inability to manage cold chain logistics for sensitive cell and gene therapy products will lead to product loss and compliance issues
- Lack of value-added services (e.g., technical support, inventory management) will make distributors interchangeable

Opportunity

- Offer specialized cold chain logistics and last-mile delivery for cell and gene therapies, capturing a niche \$1B+ market by 2029
- Provide integrated procurement and inventory management solutions for single-use bioprocessing components, reducing client operational burden by 10-15%

-
- Expand into emerging markets (e.g., APAC) by partnering with local clinical networks to support CGT development platforms

■ Actions This Week

- Invest in 2-3 advanced cold chain monitoring and logistics solutions by Q1 2027 to enhance CGT product integrity
- Develop a value-added service package for single-use bioprocessing consumables, including technical support and waste management, by Q3 2026
- Explore strategic partnerships with 1-2 South Korean or Japanese clinical networks by Q4 2026 to facilitate CGT supply chain expansion

□ Scenario: If biopharma companies consolidate their supply chains to fewer, larger partners, then Western distributors must differentiate through specialized cold chain logistics and integrated value-added services by Q2 2027 to avoid margin erosion.

□ Quick Win : Identify 5-10 key biopharma clients this week and assess their current cold chain challenges for advanced therapies.

Action Recommendations for Western Equipment Maker

Equipment Thermo Fisher Scientific, Sartorius, Danaher, GE Healthcare, Agilent Technologies

Western equipment makers are launching innovative single-use bioreactors (e.g., Thermo Fisher's DynaXS) and advanced analytical instruments, crucial for scalable cell and gene therapy manufacturing and real-time process control.

■ Risk

- Failure to integrate AI/ML capabilities into equipment will lead to competitive disadvantage against smart manufacturing solutions
- Slow adoption of single-use and closed-loop systems will limit market penetration in next-gen bioprocessing
- Lack of global manufacturing and service footprint will hinder support for international biopharma clients

■ Opportunity

- Develop AI-enabled bioreactors and automated cell processing systems to capture a \$10B+ market by 2030, offering 20-30% efficiency gains
- Expand single-use biomanufacturing portfolio to meet growing demand for CGT production, targeting 15-20% market share increase by 2028
- Partner with biosensor developers to integrate in-line monitoring and predictive control into bioprocessing equipment

■ Actions This Week

- Allocate 20% of Q4 2026 R&D; budget to integrate AI/ML for predictive control in 2-3 flagship bioreactor lines
- Expand manufacturing capacity for single-use bioreactors by 10% within 12 months, focusing on key US/EU sites
- Initiate discussions with 2-3 leading biosensor companies by Q3 2026 to co-develop integrated PAT solutions for bioprocessing equipment

□ Scenario: If automated, closed-loop biomanufacturing becomes the industry standard by 2029, then Western equipment makers must offer fully integrated, AI-enabled single-use systems by 2028 to maintain market leadership.

□ Quick Win : Identify 3-5 key pain points in current bioprocessing workflows this week that could be solved by integrating AI into existing equipment.

Impact Matrix (Players × Trends)

++ = Strong Tailwind + = Tailwind 0 = Neutral - = Headwind -- = Strong Headwind

Player	TR-01 HIGH AI & M	TR-02 HIGH Alloge	TR-03 MED Exosom	TR-04 MED FDA Ap	TR-05 LOW Next-G
Western OEM	++	++	+	+	+
Western Contract Manufacturer	+	++	0	+	+
Western T&M; Provider	+	+	+	++	++
Western Material Supplier	+	+	+	+	0
Western Distributor	0	+	+	+	+
Western Equipment Maker	++	++	+	+	++

Timeline This Week (8 Events)

Date	Tag	Headline	Source
2026-06-18	milestone	Prime Medicine secures NZ CTA for PM577a, initiating global Phase 1/2 study for Wilson disease.	USA S2-20
2026-06-18	product	Matica Bio launches 'Accelerated Korea IIT Platform' to fast-track CGT development.	South Korea S1-03
2026-06-22	policy	HHS launches cross-agency initiative to restore US clinical trial leadership, leveraging AI/ML.	USA S3-05
2026-06-23	policy	FDA approves 24 drugs in May 2026, including AbbVie's Decnupaz ADC.	USA S3-03
2026-06-24	milestone	Intellia Therapeutics initiates rolling BLA for lonvo-z after 87% HAE attack reduction in Phase 3.	USA S2-05
2026-06-25	milestone	REPROCELL submits application for Stemchymal® stem cell therapy in Japan for Spinocerebellar Ataxia.	Japan S1-17
2026-06-25	milestone	IBM unveils sub-1 nanometer Nanostack chip with 100 billion transistors.	USA S4-12
2026-06-26	milestone	Oral GLP-1 Aleniglipron achieves 12% weight loss in Phase II, poised to transform obesity treatment.	USA S3-01

Company Spotlight

Intellia Therapeutics [NTLA] ↑ +58% stock surge

In vivo CRISPR therapy lonvo-z achieved 87% HAE attack reduction in Phase 3, initiated rolling BLA with FDA.

- Monitor FDA BLA progress for lonvo-z, anticipate early 2027 market launch
- Evaluate potential for platform expansion to other genetic diseases based on lonvo-z success
- Assess competitive landscape for HAE treatments, including other gene editing approaches

Beam Therapeutics [BEAM] ↑ IND clearance for BEAM-304

Received U.S. FDA IND clearance for BEAM-304, a base editing therapy for Phenylketonuria (PKU), validating platform strategy.

- Track BEAM-304's clinical trial progress and potential for accelerated approval for PKU
- Analyze Beam's platform-based strategy for developing multiple mutation-specific editors
- Assess competitive position in AATD treatment given plans for pivotal cohort for BEAM-302

Takeda Pharmaceutical Company [TAK] ↓ Exits cell therapy, 4,500 job cuts

Undergoing major restructuring, exiting cell therapy to focus on AI-driven drug discovery, with significant job cuts.

- Analyze Takeda's strategic pivot to AI drug discovery and its implications for the cell therapy market
- Monitor the impact of 4,500 job cuts on R&D; capabilities and pipeline execution
- Evaluate potential acquisition targets in AI drug discovery that align with Takeda's new strategy

Technology Roadmap

2026

- ◆ AI-driven drug discovery candidates enter Phase 1/2 trials
- ◆ FDA approves 24 drugs in May, signaling robust pipeline

2027

- ◆ Allogeneic iPSC-derived CAR-T therapies achieve sub-7-day manufacturing
- ◆ First AI-guided microrobot drug delivery system enters clinical trials

2028

- ◆ Widespread adoption of PAT (Raman spectroscopy, in-line sensors) in continuous bioprocessing
- ◆ Serum-free media becomes standard for cellular agriculture

2029

- ◆ Commercialization of first prime editing therapies for genetic diseases
- ◆ Dual glucose-ketone wearable biosensors gain broad market acceptance

2030

- ◆ AI/ML platforms reduce drug discovery timelines by 30%
- ◆ Allogeneic CGT market reaches \$30B+, driven by cost reductions and scalability

References (92 Total)

ID	Title	Source	Date	Region	Sub-Topic
S1-01	European Biotechs Lead Next-Gen Cell & Gene Therapy Manufacturing Innovation: From Scalable Stem Cells to Clinical CAR Treg Trials	PharmTech	2026-06-25	Europe	Cell Culture Technology
S1-02	Raman Spectroscopy Emerges as Key PAT for Real-time Metabolite Monitoring in Continuous & Perfusion Bioprocessing, Aligned with ICH Q13 Guidelines	Technology Networks	2026-06-24	Global	Cell Culture Technology
S1-03	Matica Bio Unveils 'Accelerated Korea IIT Platform' to Fast-Track Cell & Gene Therapy Development with US-Korea Synergy	PR Newswire	2026-06-18	South Korea	Cell Culture Technology
S1-04	Advanced Culture Media for Cellular Agriculture: Serum-Free & Chemically Defined Formulations Boost Reproducibility, Reduce Contamination	PatSnap Eureka	2026-06-22	Global	Cell Culture Technology
S1-05	Japan Launches Akougo (Vandefitemcel): A Groundbreaking Cell Therapy Revolutionizing Chronic Motor Impairment Post-TBI	Nikkan Kogyo Shimbun (JP)	2026-06-19	Japan	Cell Culture Technology
S1-06	iPSC-Derived Immune Cells Pave Way for Scalable Allogeneic T-Cell Therapy Platforms in Cancer Immunotherapy	MDPI	2026-06-25	Global	Cell Culture Technology
S1-07	SK pharmteco Unveils SKyvec™ Viral Vector Platform, Boosting AAV Productivity by 5-6 Fold for Gene Therapy Development	Contract Pharma	2026-06-24	Global	Cell Culture Technology
S1-08	Thermo Fisher Scientific Unveils DynaXS Single-Use Bioreactor and Global Manufacturing Expansion at BIO 2026, Boosting Cell & Gene Therapy Production	Business Wire	2026-06-22	US	Cell Culture Technology
S1-09	BioInsights Reports >95% T-Cell Recovery with Closed-Loop Centrifugation, Streamlining Cell Therapy Workflows	BioInsights	2026-06-25	Global	Cell Culture Technology
S1-10	Japan Leads Global Ophthalmic Regenerative Medicine with First iPSC Retinal Transplant and Cultured Corneas, Backed by Proactive Regulation	Ophthoagent	2026-06-23	Japan	Cell Culture Technology
S1-11	Syntax Bio & Applied StemCell Partner to Accelerate Allogeneic iPSC Therapies with Low-Immunogenicity Lines and Cellgorithm Platform	Manufacturing Chemist	2026-06-25	US	Cell Culture Technology
S1-12	Cellforce One Clinic Tokyo Establishes 'Cell Processing Governance' Under Japan's Regenerative Medicine Law, Offers MSC Therapies for Chronic Pain and Osteoarthritis	Cellforce One Clinic Tokyo	2026-06-18	Japan	Cell Culture Technology

ID	Title	Source	Date	Region	Sub-Topic
S1-13	UniXell Biotechnology Secures US FDA IND Clearance for Off-the-Shelf Parkinson's Cell Therapy UX-DA003, Accelerating Dual China-US Clinical Development	BioPharma APAC	2026-06-24	US	Cell Culture Technology
S1-14	Lonza's OptiALTO™ Platform Leverages Raman Spectroscopy as PAT to Significantly Boost High-Cell-Density Culture Productivity	Lonza	2026-06-26	Switzerland	Cell Culture Technology
S1-15	Samsung Biologics Revolutionizes Bioprocess Manufacturing Intelligence by Integrating Digital Twin and AI for Proactive Decision-Making	Samsung Biologics	2026-06-24	South Korea	Cell Culture Technology
S1-16	AI and Machine Learning Optimize Protein Design for Cost Efficiency in Large-Scale Production, Achieving 20-30% Energy Reduction	PatSnap Eureka	2026-06-23	Global	Cell Culture Technology
S1-17	REPROCELL Submits Application for Manufacturing and Marketing Approval in Japan for Stemchymal® Stem Cell Therapy for Spinocerebellar Ataxia (SCA3 and SCA6)	BioSpace	2026-06-25	Japan	Cell Culture Technology
S1-18	Bioprocessing Technologies Reshape Food Production, Environmental Applications, and Sustainable Manufacturing Beyond Pharma	Technology Networks	2026-06-24	Global	Cell Culture Technology
S1-19	In-Line Sensors Play Crucial Role in Single-Use Biomanufacturing, Driving PAT Adoption and Enhancing Process Control	Technology Networks	2026-06-24	Global	Cell Culture Technology
S1-20	Data Integrity in Bioprocessing: ALCOA+ Compliance Critical for Ensuring Reliability of GMP Records	Lab Manager	2026-06-25	Global	Cell Culture Technology
S1-21	arXiv Paper: Raman Data Fusion with Latent ODE Enhances Cell Culture Process Forecasting Accuracy	arXiv (Preprint)	2026-06-26	Global	Cell Culture Technology
S1-22	Syntax Bio and Applied StemCell Partner to Accelerate Allogeneic Cell Therapies with GMP-Compliant Hypoimmune iPSCs and Cellgorithm Platform	CRISPR Medicine News	2026-06-23	US	Cell Culture Technology
S1-23	CAR-T Cell Therapy for Autoimmune Diseases Achieves 40-60% Cost Reduction and Sub-7-Day Manufacturing Through Gene Editing and Process Optimization	Market Intelo	2026-06-24	US	Cell Culture Technology
S1-24	Cell Therapy Scale-Up and CDMO Staff Reductions Trigger Critical Process Know-How Loss in Tech Transfer	Drug Discovery and Development	2026-06-22	US	Cell Culture Technology
S2-01	CRISPR Therapeutics Stock Volatility Driven by CASGEVY Commercialization and CTX112 Clinical Progress	Investing.com	2026-06-18	US	iPSC & Regenerative Medicine

ID	Title	Source	Date	Region	Sub-Topic
S2-02	Beam Therapeutics Receives U.S. FDA IND Clearance for BEAM-304, a Base Editing Therapy for Phenylketonuria (PKU)	Beam Therapeutics	2026-06-18	US	iPSC & Regenerative Medicine
S2-03	CRISPR Gene Editing Advances in 2026: Accumulation of Clinical Data and Evolving Regulatory Framework for Rare Diseases, Cancer, and Autoimmune Disorders	Industry report / Analysis	2026-06-22	US	iPSC & Regenerative Medicine
S2-04	Streamlining PBMC Processing in Multi-Site Clinical Trials Bridges Translational Gap in Drug Discovery	REPROCELL Blog	2026-06-25	Japan	iPSC & Regenerative Medicine
S2-05	Intellia Therapeutics' In Vivo CRISPR Therapy Lonvo-z Achieves 87% Attack Rate Reduction in HAE Phase 3 Trial, Initiates Rolling BLA Filing with FDA	Intellia.AI	2026-06-24	US	iPSC & Regenerative Medicine
S2-06	First Report of CRISPR-Derived Base Editing in Human Embryos Achieves Precise DNA Changes While Avoiding Large Chromosomal Aberrations	CMN Weekly (CRISPR Medicine News)	2026-06-26	Unknwn	iPSC & Regenerative Medicine
S2-07	UCLA Health Accelerates Cancer Therapy Screening with 3D Bioprinting and AI-Integrated Platform	UCLA Health Jonsson Comprehensive Cancer Center	2026-06-22	US	iPSC & Regenerative Medicine
S2-08	Allogeneic CAR-T Cell Therapies Promise to Overcome Autologous Challenges and Expand Therapeutic Potential in Solid Tumors	PubMed (Review Article)	2026-06-23	Global	iPSC & Regenerative Medicine
S2-09	Genomic Engineering Strategies and Alternative Cell Types in Allogeneic T-Cell Immunotherapy Platforms Enable Scalable Cancer Treatment	Academic Publication	2026-06-25	Global	iPSC & Regenerative Medicine
S2-10	Tacit Knowledge Loss in Cell & Gene Therapy Tech Transfer Poses Critical Threat to Manufacturing Yield and Quality	Drug Discovery and Development	2026-06-22	US	iPSC & Regenerative Medicine
S2-11	Automated Cell Therapy Manufacturing Lands \$1.1 Billion Investment, Poised to Transform Commercialization and Patient Access	Tracxn	2026-06-20	India	iPSC & Regenerative Medicine
S2-12	Beam Therapeutics Gains FDA IND Approval for In Vivo Base Editing Therapy BEAM-304 for PKU	CRISPR Medicine News	2026-06-22	US	iPSC & Regenerative Medicine
S2-13	Minaris Expands GMP Cell Banking Capabilities in Philadelphia, Enhancing Cell & Gene Therapy CDMO Services	Contract Pharma	2026-06-18	US	iPSC & Regenerative Medicine
S2-14	Sartorius and LFB BIOMANUFACTURING Broaden Partnership to Offer Integrated Cell Line Development-to-GMP Services	PharmaSource	2026-06-23	Global	iPSC & Regenerative Medicine

ID	Title	Source	Date	Region	Sub-Topic
S2-15	Exosomes: Unlocking Nature's Nanoparticles for Precision Medicine, Navigating Translational Hurdles	Frontiers	Date unknown	Global	iPSC & Regenerative Medicine
S2-16	CRISPR Medicine News Roundup: Sickle Cell CRISPR Drug Shows Potent Results in Young Children, Caribou's Off-the-Shelf CAR-T Delivers Positive Phase 1 Data	CRISPR Medicine News	2026-06-24	US	iPSC & Regenerative Medicine
S2-17	Fate Therapeutics' iPSC-Derived CAR-T FT836 Shows Early Phase 1 Data Suggesting Colorectal Tumor Shrinkage with Nine Engineered Edits	CRISPR Medicine News	2026-06-22	US	iPSC & Regenerative Medicine
S2-18	CAR-T Expands to Solid Tumors & Autoimmune Diseases; BAF CAR-T Shows Promising Early Results for Lupus, Compared with Off-the-Shelf CAR-NK Cells	University Hospitals	2026-06-18	US	iPSC & Regenerative Medicine
S2-19	Engineered Exosomes Breach Blood-Brain Barrier, Unlocking New Vistas in Neuro-Oncology	MDPI	2026-06-23	Global	iPSC & Regenerative Medicine
S2-20	Prime Medicine Secures NZ Clinical Trial Clearance for Prime Editing Therapy PM577a in H1069Q-Mutated Wilson Disease, Initiating Global Phase 1/2 Study	GlobeNewswire (Prime Medicine Press Release)	2026-06-18	US	iPSC & Regenerative Medicine
S2-21	Prime Medicine's Autologous Prime Editing Hematopoietic Stem Cell Therapy PM359 for p47phox-Deficient Chronic Granulomatous Disease Receives FDA RMAT Designation	BiopharmaWatch (Prime Medicine Press Release)	2026-06-23	US	iPSC & Regenerative Medicine
S2-22	Cell-Free Advantage: Exosome-Biomaterial Platforms Offer Safer Treatment for Diabetic Skin Infections, But Clinical Translation Remains Complex	International Journal of Nanomedicine	2026-06-26	Global	iPSC & Regenerative Medicine
S2-23	AATD Treatment Race Intensifies: Beam Therapeutics Plans Pivotal Cohort for Accelerated Approval of Base Editor BEAM-302	CRISPR Medicine News	2026-06-24	US	iPSC & Regenerative Medicine
S2-24	Takeda Exits Cell Therapy, Shifts Strategy to AI Drug Discovery with Additional 4,500 Job Cuts in Restructuring	BioSpace	2026-06-24	US	iPSC & Regenerative Medicine
S2-25	Dermatology & Plastic Surgery Specialists Introduces Exosome Therapy for Anti-Aging: Harnessing Stem Cell Culture-Derived Extracellular Vesicles for Skin Regeneration	Dermatology & Plastic Surgery Specialists (Blog)	2026-06-22	US	iPSC & Regenerative Medicine
S2-26	Regentis Biomaterials Secures \$6.5M Private Placement to Accelerate Regenerative Tissue Repair Solutions	BioSpace (Press Release)	2026-06-18	Israel	iPSC & Regenerative Medicine

ID	Title	Source	Date	Region	Sub-Topic
S2-27	Synthetic Biology Firm Syntax Bio Expands Series A to \$14.4M, Boosting Preclinical Research for CRISPR-Based Type 1 Diabetes Beta-Cell Therapy	Fierce Biotech	2026-06-21	US	iPSC & Regenerative Medicine
S2-28	ROKIT America Clears SEC Registration Statement for Nasdaq Listing, Raises KRW 38 Billion to Accelerate Regenerative Medicine Commercialization	Korea Biomedical Review (KBR)	2026-06-24	South Korea	iPSC & Regenerative Medicine
S2-29	Advances in Multiple Myeloma Treatment: CAR-T, Bispecific Antibodies, and Antibody-Drug Conjugates Evolving in Approved & Clinical Stages	Myeloma Crowd	2026-06-25	US	iPSC & Regenerative Medicine
S2-30	Top 10 Emerging Healthcare Technologies in 2026: CRISPR Gene Editing Established as Therapeutic Category, Regenerative Medicine Nearing Clinical Application	Slate	2026-06-23	US	iPSC & Regenerative Medicine
S2-31	Long-Read DNA Sequencers Market to Accelerate by 2035 Amid Biopharma Quality Control Demand: Essential for CAR-T Genomic Evaluation	IndexBox News and Statistics	2026-06-26	Global	iPSC & Regenerative Medicine
S2-32	Samsung Biologics Expands Bio R&D; Center Beyond CDMO Support, Investing in Next-Gen Modalities, AI, and Machine Learning	Korea Biomedical Review (KBR)	2026-06-25	South Korea	iPSC & Regenerative Medicine
S2-33	Europe's Regulatory Frontier for Advanced Biologics: Real-World Evidence and Patient Voices Shape Cell and Gene Therapies	ResearchGate	2026-06-18	Global	iPSC & Regenerative Medicine
S3-01	Oral GLP-1 Aleniglipton Achieves 12% Weight Loss in Phase II, Poised to Transform Obesity Treatment	Health and Me / Northwestern University	2026-06-26	US	Drug Discovery & DDS
S3-02	FDA Greenlights Breakthrough TNBC Therapies, First-in-Class Hypertriglyceridemia Drug, and New Breast Cancer Maintenance Regimen	FDA	2026-06-24	US	Drug Discovery & DDS
S3-03	FDA Greenlights 24 Drugs in May 2026, Featuring AbbVie's Decnupaz ADC and Shionogi's Xocova COVID-19 Oral	BioWorld	2026-06-23	US	Drug Discovery & DDS
S3-04	ClinicalTrials.gov Completes Modern Platform Migration, Dramatically Elevating Clinical Trial Data Access and Transparency	ClinicalTrials.gov	2026-06-23	US	Drug Discovery & DDS
S3-05	HHS Launches Cross-Agency Initiative to Restore US Clinical Trial Leadership, Leveraging AI/ML for Enhanced Safety & Efficiency	HHS.gov	2026-06-22	US	Drug Discovery & DDS
S3-06	Breaking the Blood-Brain Barrier: Next-Gen Strategies Unveil Neurological Drug Delivery Innovation	Pharmaceutical Conferences 2026	2026-06-22	International	Drug Discovery & DDS

ID	Title	Source	Date	Region	Sub-Topic
S3-07	Vertex AI-Designed Candidates Hit Phase 1/2 Trials, Accelerating AI-Driven Drug Discovery	Vertex AI Search (PharmaJournalist)	2026-06-18	US	Drug Discovery & DDS
S3-08	Major Setback: Pfizer's Seagen-Acquired ADC Fails Phase 3 in Advanced Lung Cancer	BioPharma Dive	2026-06-23	US	Drug Discovery & DDS
S3-09	HHS Unveils Strategy to Accelerate US Drug Discovery, Stemming Clinical Trial Shift to China	BioPharma Dive	2026-06-23	US	Drug Discovery & DDS
S3-10	Novartis' Acquired RNA Therapeutic del-brax Achieves Phase 1/2 Success for Muscle-Wasting Diseases	BioPharma Dive	2026-06-23	US	Drug Discovery & DDS
S3-11	BMS Reveals Promising Clinical Data for Next-Gen Blood Cancer Therapy Mezigdomide	BioPharma Dive	2026-06-23	US	Drug Discovery & DDS
S3-12	MAIA Biotechnology Completes Global Enrollment for Phase 2 Ateganosine Trial in Refractory NSCLC	GlobeNewswire	2026-06-25	US	Drug Discovery & DDS
S3-13	RQ Bio Secures \$115M to Fast-Track Long-Acting Antibody RQB01, Revolutionizing Flu Prevention for Vulnerable Patients	GlobeNewswire	2026-06-24	UK	Drug Discovery & DDS
S3-14	Biogen Pivots Post-Apellis Acquisition: Halts Most R&D, Concentrates on Commercial Assets	Endpoints News	2026-06-26	US	Drug Discovery & DDS
S3-15	Antares and Novartis Forge \$1.9B Deal to Tackle 'Undruggable' Cancer Targets with Small Molecules	Business Wire	2026-06-24	US	Drug Discovery & DDS
S3-16	Biotech CEOs Anticipate Funding Rebound by Late 2026, Pin Hopes on FDA for Streamlined Drug Development	Endpoints News	2026-06-24	US	Drug Discovery & DDS
S3-17	Bayer and Iambic Therapeutics Partner to Drive Small Molecule Drug Discovery with AI Platform	BioSpace	2026-06-23	US	Drug Discovery & DDS
S3-18	Elixirgen Therapeutics and Nippon Shinyaku Forge Alliance for Next-Gen DMD Therapy EXG-7001	GlobeNewswire	2026-06-26	Japan	Drug Discovery & DDS
S3-19	Otsuka's ADHD Therapy Poised for FDA Approval Following Successful Phase 3b Clinical Trial	Fierce Biotech	2026-06-25	US	Drug Discovery & DDS
S3-20	Boehringer Ingelheim Fuels Immunai's AI with \$15M to Unlock T-Cell Secrets for Cancer, Autoimmune Drug Discovery	Fierce Biotech	2026-06-25	US	Drug Discovery & DDS
S3-21	Ionis Forges \$30M Ex-US Rare Disease Pact with Recordati, Accelerating Global ASO Reach	Fierce Biotech	2026-06-25	US	Drug Discovery & DDS

ID	Title	Source	Date	Region	Sub-Topic
S4-01	AI-Guided Microrobots Achieve Spatiotemporally Controlled Intracavitary Drug Release, Dramatically Enhancing Bladder Tumor Therapy in Murine Models	Nature Nanotechnology	2026-06-22	International	Biosensors
S4-02	Coherent 2D–3D van der Waals Perovskite Heterostructures Achieved with Atomically Sharp Interfaces and Gate-Tunable Rectification for Advanced Sensors	Nature Nanotechnology	2026-06-23	International	Biosensors
S4-03	Nanotechnology-Mediated Precision mRNA Delivery Revolutionizes Vaccines and Gene Therapies by Minimizing Off-Target Effects and Maximizing Efficiency	Nature Materials	2026-06-18	International	Biosensors
S4-04	ASCO Breakthrough 2026 Unveils Over 300 Abstracts Highlighting Advances in Liquid Biopsy, Metabolic Risks, and Tailored Cancer Therapies for Asian Populations	American Society of Clinical Oncology (ASCO) / The ASCO Post	2026-06-22	US	Biosensors
S4-05	UTMB Researchers Secure USDA Funding for AI-Enabled Nanobody Biosensor for Rapid Screwworm Detection, Achieving 15-Minute Field Results	The University of Texas Medical Branch	2026-06-25	US	Biosensors
S4-06	CNET Names Dexcom Stelo, Abbott FreeStyle Libre 3 Plus, and Eversense 365 as Top Continuous Glucose Monitors for 2026, Setting New Standards in Blood Sugar Management	CNET	2026-06-19	US	Biosensors
S4-07	ASCO Annual Meeting 2026 Signals New Era in Lung Cancer Treatment: Adjuvant Targeted Therapy and ADCs Reshape Immunotherapy Strategies	Targeted Oncology	2026-06-22	US	Biosensors
S4-08	Sensor-Integrated Organ-on-Chip Devices Advance Drug Screening and Tissue Engineering with High Efficiency and Automation Capabilities	PMC (PubMed Central)	2026-06-22	International	Biosensors
S4-09	ADA 2026: CGM Applications Expand to Type 2 Diabetes; Continuous Ketone Monitoring and Dual Sensors Advance DKA Prevention	Pharmacy Times	2026-06-24	US	Biosensors
S4-10	Oxford Researchers Secure ARIA Funding to Develop Transformative 'Smart' DNA Medicines Activating Targeted Antiviral Therapies Through Programmable Biosensors	University of Oxford	2026-06-25	UK	Biosensors
S4-11	Wearable Electrochemical Aptamer Sensor Achieves Ultra-Sensitive Cortisol Detection in Artificial Sweat with 93.4% Stability Over 56 Days: ACS Omega Study	ACS Omega (American Chemical Society)	2026-06-22	International	Biosensors

ID	Title	Source	Date	Region	Sub-Topic
S4-12	IBM Unveils Sub-1 Nanometer Nanostack Chip with 100 Billion Transistors, Establishing Foundational Platform for Next-Gen Biosensors	StockNews.com	2026-06-25	US	Biosensors
S4-13	Dexcom Advances 'Glucose Biosensing for All' Vision with Pediatric Clearance for Stelo Biosensor and Relaunch of Redesigned App	Business Wire	2026-06-23	US	Biosensors
S4-14	Roche Diagnostics Strengthens Comprehensive POCT Portfolio, Driving Rapid and Accurate On-Site Diagnostics for Critical Conditions	Roche Diagnostics	2026-06-23	Switzerl and	Biosensors

Editor's Note

Navigating the Bio-Revolution: Strategic Imperatives for Western Leadership

The medical and bio sector is at an inflection point, with AI, advanced cell therapies, and precision diagnostics converging to redefine healthcare. Western manufacturers, investors, and executives face a dual imperative: aggressively adopt transformative technologies while strategically navigating a complex global competitive landscape. The rapid progress in allogeneic cell and gene therapies, coupled with AI's accelerating impact on drug discovery and bioprocessing, demands immediate and decisive action to secure future market leadership.

To maintain a competitive edge, Western players must prioritize investment in automated, closed-loop manufacturing systems for advanced biologics, leveraging AI for process optimization and quality control. Furthermore, securing intellectual property in gene editing and iPSC technologies is paramount. Strategic partnerships with AI platform developers and specialized CDMOs, particularly those focused on scalable allogeneic production, will be critical to shorten development cycles and expand patient access.

The rise of advanced biosensors and precision drug delivery systems signals a shift towards preventive and personalized medicine. Western companies should explore integrating these diagnostic and therapeutic modalities to create comprehensive patient solutions. Proactive engagement with evolving regulatory frameworks, such as those supporting advanced manufacturing and real-world evidence, will also be essential to accelerate market entry and ensure ethical, safe deployment of groundbreaking medical innovations.

- ◆ How can Western OEMs best leverage AI/ML to reduce drug discovery timelines by 30% and gain a 12-18 month lead on competitors?
- ◆ What specific investments in automated, closed-loop bioprocessing are required by Q4 2027 to achieve 40-60% cost reductions for allogeneic cell therapies?
- ◆ Which strategic partnerships with biosensor developers will enable Western players to integrate real-time diagnostics into therapeutic offerings, capturing new market segments by 2029?

Troy Technical Weekly Editorial Team Editorial Assistant

Next Issue Vol. 49 Monday, July 6, 2026 06:00 JST Feature: Personalized Oncology & Digital Health

troy-technical.com original curation. Article copyrights belong to original authors. | Gemini API + Claude | Monday, June 29, 2026 06:00 JST