Ludwig Institute for Cancer Research Ltd, Zurich

Report of the Statutory Auditor on the Consolidated Financial Statements to the General Meeting of Shareholders

Consolidated Financial Statements 2019

KPMG AG
Zurich, May 22, 2020

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Report of the Statutory Auditor to the General Meeting of Shareholders of

Ludwig Institute for Cancer Research Ltd, Zurich

Report of the Statutory Auditor on the Consolidated Financial Statements

As statutory auditor, we have audited the accompanying consolidated financial statements of Ludwig Institute for Cancer Research Ltd, which comprise the balance sheet, income statement, statement of cash flows, statement of capital changes and notes for the year ended December 31, 2019.

Board of Directors' Responsibility
The board of directors is responsible for the preparation of the consolidated financial statements in accordance with Swiss GAAP FER and the requirements of Swiss law. This responsibility includes designing, implementing and maintaining an internal control system relevant to the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error. The board of directors is further responsible for selecting and applying appropriate accounting policies and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility
Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We conducted our audit in accordance with Swiss law and Swiss Auditing Standards. Those standards require that we plan and perform the audit to obtain reasonable assurance whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers the internal control system relevant to the entity's preparation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control system. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of accounting estimates made, as well as evaluating the overall presentation of the consolidated financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the consolidated financial statements for the year ended December 31, 2019 give a true and fair view of the financial position, the results of operations and the cash flows in accordance with Swiss GAAP FER and comply with Swiss law.

Report on Other Legal Requirements

We confirm that we meet the legal requirements on licensing according to the Auditor Oversight Act (AOA) and independence (article 728 CO) and that there are no circumstances incompatible with our independence.

In accordance with article 728a paragraph 1 item 3 CO and Swiss Auditing Standard 890, we confirm that an internal control system exists, which has been designed for the preparation of consolidated financial statements according to the instructions of the board of directors.

We recommend that the consolidated financial statements submitted to you be approved.

KPMG AG

Martin Schaad
Licensed Audit Expert
Auditor in Charge

Ludwig Weinschrod
Licensed Audit Expert

Zurich, May 22, 2020

Enclosures:
- Consolidated financial statements (balance sheet, income statement, statement of cash flows, statement of capital changes, notes)

CONSOLIDATED BALANCE SHEET AS AT DECEMBER 31, 2019

	Notes	USD 2019	2018
Assets			
Cash and cash equivalents	2, 3	22,191,698	27,790,788
Financial assets	2, 4, 9	1,238,255,422	1,071,645,424
Trade receivables		158,608	97,054
External funding receivables	2	1,881,616	2,639,711
Other short-term receivables	5, 12	4,597,044	4,842,810
Prepaid expenses and accrued income		1,938,493	1,612,170
Total current assets		**1,269,022,881**	**1,108,627,957**
Financial assets	2, 6	358,696,889	338,026,802
Investments	2, 7	1,057,754	527
Net deferred tax assets	2, 17	3,856,929	3,277,175
Leasehold improvements, equipment & other assets	2	30,187	45,635
Total non-current assets		**363,641,759**	**341,350,139**
Total assets		**1,632,664,640**	**1,449,978,096**
Liabilities			
Short-term accounts payable		7,041,881	4,123,993
Other short-term liabilities	9, 11	573,224	1,477,619
Short-term provisions	12	3,174,473	3,121,794
Accrued short-term expenses		7,415,367	6,176,424
Deferred income	2, 13	10,420,512	14,582,841
Total short-term liabilities		**28,625,457**	**29,482,671**
Other long-term liabilities	14	1,478,955	1,508,017
Long-term provisions	15	12,443,549	9,708,756
Total long-term liabilities		**13,922,504**	**11,216,773**
Total liabilities		**42,547,961**	**40,699,444**
Shareholders' equity			
Share capital	1	49,618	49,618
Donated capital	1	572,000,000	572,000,000
General legal retained surplus	1	9,924	9,924
Voluntary retained surplus	1	1,018,057,137	837,219,110
Total shareholders' equity		**1,590,116,679**	**1,409,278,652**
Total liabilities and shareholders' equity		**1,632,664,640**	**1,449,978,096**

CONSOLIDATED INCOME STATEMENT FOR THE YEAR ENDED DECEMBER 31, 2019

	Notes	USD 2019	USD 2018
Operating income			
Contributions, dividends & interest income	2	3,600,905	4,688,373
External funding	2, 13	20,463,487	20,959,067
License fees and royalties		2,230,765	2,537,437
Other operating income	8	153,681	127,806
Total operating income		**26,448,838**	**28,312,683**
Operating expenses			
Salaries and social benefits	10, 16	38,839,553	39,264,816
Laboratory supplies		5,745,947	6,346,110
Equipment and leasehold improvements	2, 8	987,705	994,884
Clinical trial studies		4,149,041	4,072,296
Core collaborative research programs	2	19,620,764	18,788,019
Other collaborative research programs	2	8,178,337	7,560,550
Occupancy		4,981,825	4,952,863
Travel, conferences and seminars		676,712	917,078
Professional fees and services		5,504,486	5,807,957
Patent and inventors' costs		1,030,159	948,137
Depreciation	2	19,425	27,813
Other operating expenses		2,043,092	2,241,446
Total operating expenses		**91,777,046**	**91,921,969**
Other items			
Loss from change in accounting for investments	6, 7	0	(5,590,965)
Share of operational loss & capital items in associated entity	6, 7	(128,028)	0
Gain on foreign exchange	9	168,290	1,238,436
Loss on foreign exchange	4, 9	(501,637)	(1,735,893)
Gain on financial assets & investments	2	311,534,022	155,091,097
Loss on financial assets & investments	2	(69,325,438)	(198,135,912)
Total other items		**241,747,209**	**(49,133,237)**
(Deficit) / Surplus for the year before taxes		176,419,001	(112,742,523)
Taxes			
Current income tax expense	2, 17	(59,495)	(158,762)
Deferred income tax income / (expense)	2, 17	316,192	236,838
Total taxes		**256,697**	**78,076**
Retained surplus			
(Deficit) / Surplus for the year after taxes		176,675,698	(112,664,447)
Voluntary retained surplus at the beginning of the year		837,219,110	947,688,374
Net change in restricted funds	2, 13	4,162,329	2,195,183
Voluntary retained surplus at the end of the year		**1,018,057,137**	**837,219,110**

CONSOLIDATED STATEMENT OF CASH FLOWS FOR THE YEAR ENDED DECEMBER 31, 2019

	Notes	USD 2019	2018
Operating activities			
(Deficit) /Surplus for the year after taxes		176,675,698	(112,664,447)
Net change in restricted funds	13	4,162,329	2,195,183
Adjustments for non-cash items			
Loss from change in accounting for investments	6, 7	0	7,159,216
Share of operational loss & capital items in associated entity	6, 7	128,028	0
Net loss / (gains) on financial assets		(239,810,237)	42,484,358
Deferred tax changes	2, 17	(579,754)	(399,874)
Forex (loss) / gain on cash & cash equivalents		110,444	723,986
Other (income) / expense items		0	(4,480)
Depreciation / Impairment	2	1,833,811	27,813
Other movements in operating assets and liabilities			
Increase / (decrease) in provisions		2,787,472	615,297
(Increase) in current and non-current financial assets and investments		(6,513,243)	(1,630,584)
Decrease / (Increase) in receivables		942,307	860,150
Decrease in prepayments & accrued income		(326,323)	1,197,758
(Decrease) / Increase in current liabilities		2,013,493	(2,906,136)
(Decrease) in accrued liabilities & deferred income		(2,923,386)	(582,713)
Increase in long-term liabilities & long-term accrued expenses		(29,062)	167,356
Cash flow from operating activities		**(61,528,423)**	**(62,757,117)**
Investing activities			
Investment in tangible fixed assets	2	(3,977)	(10,533)
Investment in financial assets		(531,076,997)	(530,555,042)
Sale of financial assets and repayment of loans		587,120,751	576,724,821
Cash flow from investing activities		**56,039,777**	**46,159,246**
Net cash (outflow) / inflow		**(5,488,646)**	**(16,597,871)**
Cash & cash equivalents at January 1		27,790,788	45,112,645
Forex effect on cash & cash equivalents		(110,444)	(723,986)
Net cash (outflow) / inflow		(5,488,646)	(16,597,871)
Cash & cash equivalents at December 31		**22,191,698**	**27,790,788**

CONSOLIDATED STATEMENT OF CAPITAL CHANGES FOR THE YEAR ENDED DECEMBER 31, 2019

Shareholders' equity

The share capital consists of 50 fully paid shares of nominal value CHF 1,000 each. The shareholders do not have any interest in the assets or income of the Ludwig Institute for Cancer Research Ltd. Their sole power is to exercise their voting rights in accordance with the exclusively charitable and scientific purposes of the Institute.

USD	Share Capital	General legal retained surplus	Donated capital	Voluntary retained surplus	Shareholders' equity
Balance at December 31, 2017	50,592	10,118	572,000,000	947,688,374	1,519,749,084
(Deficit) / Surplus for the year	0	0	0	(112,664,447)	(112,664,447)
Translation adjustment	(974)	(194)	0	0	(1,168)
Net change in restricted funds	0	0	0	2,195,183	2,195,183
Balance at December 31, 2018	**49,618**	**9,924**	**572,000,000**	**837,219,110**	**1,409,278,652**
(Deficit) / Surplus for the year	0	0	0	176,675,698	176,675,698
Net change in restricted funds	0	0	0	4,162,329	4,162,329
Balance at December 31, 2019	**49,618**	**9,924**	**572,000,000**	**1,018,057,137**	**1,590,116,679**

Donated capital

Universe Tankships, Inc. made the following donations to LICR Fund, Inc.:

	Year	USD Amount
Initial donation	1990	500,000,000
Second donation	1991	24,000,000
Third donation	1992	48,000,000
Total		**572,000,000**

Voluntary retained surplus

The Statutes of the Ludwig Institute for Cancer Research Ltd stipulate that the surplus for the year is not to be distributed to shareholders and accordingly the available voluntary retained surplus is carried forward.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS AS AT DECEMBER 31, 2019

1. Accounting principles and scope of consolidation

Basis of presentation

The accompanying consolidated financial statements of the Ludwig Institute for Cancer Research Ltd (the Institute) are presented in accordance with generally accepted accounting principles in Switzerland (Financial Reporting Standards - Swiss GAAP FER).

Scope of consolidation

The consolidated financial statements include the financial results of the Institute, a not-for-profit organization incorporated in Zurich, Switzerland, the LICR Fund, Inc. (the Fund), a not-for-profit membership corporation incorporated in Delaware, U.S.A, which was established to receive, hold and invest funds on behalf of the Institute and which is effectively controlled by the Institute, and Universe Tankships, Inc. (UTI), a Marshall Islands corporation, which is a wholly-owned subsidiary of the Institute.

All inter-company transactions and balances have been eliminated. No minority interests exist for either the Fund or UTI.

Ludwig Technologies, Inc., a Delaware, USA corporation wholly-owned subsidiary of the Institute, has been accounted for at acquisition cost. Similarly, investments of insignificant value or negative equity, in which the Institute holds at least 20% but not more than 50%, have been accounted for at acquisition cost and, if applicable, adjusted for impairment losses.

Vaccitech Oncology Limited (VOLT), Oxford, UK, is a company founded in 2019 to collaborate with Vaccitech Limited. The Institute's share is 24% of the capital and is accounted for at acquisition cost adjusted for impairment.

Nature of operations

The Institute carries out its scientific and clinical activities at various Branches in conjunction with hospitals in university medical centres. During 2019 the Institute’s research Branches were situated in Lausanne, Oxford and San Diego and research laboratories in Brussels, Stockholm and at the Memorial Sloan Kettering Cancer Center in New York. In addition, administrative offices were maintained in New York and Zurich. The Institute has a broadly based research program that addresses the challenge of cancer using the disciplines of cell biology, genetics, immunology, molecular biology and virology.

2. Accounting policies and valuation standards

Cash and cash equivalents

Cash and cash equivalents include cash on hand and at banks, funds on call and cash deposits.

Core and other collaborative research programs

Collaborative research programs are divided into core and other collaborative research programs. The Lausanne Branch, the Oxford Branch, Memorial Sloan Kettering Cancer Center (MSKCC), New York and the Wistar Institute, Philadelphia are considered as core, whereas all other research activities are considered as other.

Current assets - Financial assets
Investments in debt and equity securities with readily determinable fair values are reported at fair value based upon the last quoted market price, or published net asset value for certain investment funds with characteristics similar to a mutual fund. Publicly traded investments are valued at the last reported sales price on the date of valuation, as quoted on major securities exchanges. Securities that are not traded on major securities exchanges are valued based on quotations received from leading vendors. Forward foreign currency contracts are valued at the average of closing bid and ask quotations from banks and brokers. Pooled investments are funds that are not held at the Fund's custodian bank. These funds are part of multiple investors' commingled funds, which are invested in one or more asset classes by a fund manager. These investments are valued at their closing net asset value per share on the valuation date, which is their redeemable value.

The Fund invests in limited partnerships formed for the purpose of earning returns from alternative investment strategies. Investments in limited partnerships held by the Fund are reported at net asset value as a practical expedient for fair value, which generally represents the Fund's proportionate share of the net assets of the investee partnerships as reported by partnership and reviewed by management for reasonableness. The underlying partnerships in which the Fund invests may hold nonmarketable securities, the fair value of which has been determined by the general partners of the respective partnerships. The Fund's proportionate share of net asset values may differ significantly from the fair values that would have been used had a ready market existed. The Fund's proportionate share of the change in values of the investee partnerships is recorded as a gain or loss on financial assets & investments in the Consolidated Income Statement. Investments in mutual funds are valued at their closing published net asset value per share on the valuation date, which was their redeemable value.

Securities transactions are recorded on the trade date. Realized gains and losses on security transactions are calculated on the average cost basis.

The Fund invests in various investment securities. Investment securities are subject to various risks such as interest rate, market and credit risks. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term and could materially affect the amounts reported in the Balance Sheet.

Non-current assets – Financial assets and Investments
Financial assets held by the Fund which are subject to a redemption or lockup period of more than one year are presented as non-current assets.

Financial assets held by other consolidated entities are presented as non-current assets based on the intention to keep them for the longer term.

If fair values are readily determinable, these financial assets are reported at fair value based upon the last quoted market price.

Investments in companies where the holding is greater than 20% of the share capital are valued using the equity method, unless they are of insignificant value or hold negative equity.

Other financial assets and investments are accounted for at acquisition cost and adjusted for impairment losses, if applicable.

External funding
External funding received from any outside source, whether of a cash or a non-cash nature, is recorded in the books of the Institute upon receipt as Deferred income. External funding received is converted to income when the corresponding expenditure is incurred. Any unspent external funding is deferred to future accounting periods until the corresponding expenditure is incurred or excess funding is returned to the external funding partner once the project has been concluded. External funding pledged but not received in respect of an expenditure that has been incurred is recorded as income and is accounted for on the balance sheet as External funding receivables.

Tangible and intangible assets
The Institute's expenditure on research equipment, leasehold improvements and other assets is expensed in the year it is incurred in accordance with accepted practice for cancer research organizations. The resale value of research equipment is minimal and no significant income is generated therefrom. With respect to UTI as a taxable entity, purchases of equipment and leasehold improvements are capitalized and depreciated.

All operating expenditure, including the cost of patenting and licensing intellectual property, is expensed in the year it is incurred.

Taxes
The Institute and the Fund are tax-exempt organizations and accordingly are not subject to income and capital taxes. UTI is subject to income and capital taxes. Deferred tax assets and liabilities are recognized for future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date.

Withholding taxes on foreign dividends and interest have been provided for in accordance with the applicable countries' tax rates.

3. Pledged assets
The Institute has pledged assets held by a financial institution to that institution amounting to USD 1.1 million in 2019 and USD 1.1 million in 2018. These amounts are included under Cash & cash equivalents and are used as collateral for various letters of credit amounting to a total of USD 1.5 million. The letters of credit have been issued to the lessors of various office premises occupied by the Institute.

In 2018, the Fund terminated its revolving USD 25.0 million line of credit with a financial institution. The Fund obtained a revolving line of credit of USD 15 million through a financial institution on April 10, 2019. There is no expiration date and the agreement may be terminated by either party with written notice. There were no amounts outstanding under this agreement at December 31, 2019. The line of credit is collateralized by qualifying assets with a fair value of approximately USD 36 million at December 31, 2019.

4. Current assets - Financial assets

Financial assets held as current assets as at December 31, 2019 and 2018 were as follows:

	USD	
Description	2019	2018
Invested cash and cash equivalents		
- US Dollars	9,794,867	10,327,672
- Other currencies	195,857	2,117,217
Equity investments	50,757,039	64,230,196
Fixed income investments		
- Government	30,785,830	28,409,937
- Corporate	3,551,225	5,586,462
Investments at net asset value	1,131,606,907	943,826,443
Due from brokers	10,326,883	17,210,295
Net unrealized (loss) on forward contracts	1,236,814	(62,798)
Total current financial assets	**1,238,255,422**	**1,071,645,424**

5. Other short-term receivables

Other short-term receivables of USD 4,597,044 as at December 31, 2019 and USD 4,842,810 as at December 31, 2018 did not include doubtful debts.

6. Non-current assets - Financial assets

	USD	
Description	2019	2018
CT Atlantic AG		
Net investment	9,924	9,924
iOx Therapeutics Limited		
Net investment	33	33
iTeos Therapeutics, Inc.		
Net investment	1,501,274	1,501,274
Life Sciences Pharmaceuticals, Inc.		
Net investment	1,457	1,457
Opthea Limited (formerly Circadian Technologies Ltd.)		
Net investment	0	1,279,365
Premier Veterinary Group plc (formerly Ark Therapeutics Group plc)		
Net investment	0	2,160
Serametrix Corporation		
Net investment	0	100
Other		
Fixed income securities	5,075,220	4,879,440
Investments at net asset value	350,595,672	329,155,357
Loans to staff	34,354	40,754
US 457(b) Pension plan (see Note 14)	1,478,955	1,156,938
Total financial assets	**358,696,889**	**338,026,802**

The Institute is committed to disseminating its know-how to the global research community. The holdings in the start-up organizations shown under Financial assets in the Balance Sheet are the result of licensing arrangements, with start-up organizations or their successors, transferring Institute research knowledge to these companies. Participation in these entities does not form part of the Institute's long term strategy and the respective Financial assets, if not quoted on a stock exchange, are valued at acquisition cost and if applicable, adjusted for impairment losses.

In 2019, all shares of Opthea Limited, Premier Veterinary Group plc and Serametrix Corporation were sold and a total gain on sales of financial assets of USD 4,442,789 was realized.

In 2015, iOx Therapeutics Limited, Oxford, United Kingdom, was launched to develop novel cancer immunotherapies discovered through a collaboration between the Institute and the University of Oxford. The company was granted a royalty-bearing license from the Institute, providing rights to intellectual property. The nominal share capital of iOx Therapeutics Limited is GBP 253.

iTeos Therapeutics, Inc., Delaware, USA, was founded in 2012 and is a joint spin-off of the Institute and the de Duve Institute at the Catholic University of Louvain (Belgium). Capital of EUR 3.1 million (USD 4.1 million) was raised from the Institute, Hunza Ventures SCA, Life Sciences Research Partners, VIVES Louvain Technology Fund and several business angels. This financing complements a EUR 6 million non-dilutive grant from the Belgian Walloon Government, which was received in December 2011. iTeos Therapeutics', Inc. research program focusses on the development of small-molecule immunomodulators that can increase the efficacy of cancer immunotherapy, as well as leverage the spontaneous tumor immune response. The start-up nominal share capital, including the premium on capital stock, amounted to EUR 3,076,498 (USD 4,056,055). Due to a new financing round of USD 75 million in which the Institute did not participate, the Institute's portion of the shares dropped from 37.22% to 7.56%. Due to this dilution of ownership the investment has been reclassified from Investments in 2018 (see also note 7).

The Institute has granted various housing loans to San Diego Branch staff. The outstanding long-term receivables amounted to USD 34,354 as at December 31, 2019 and USD 40,754 as at December 31, 2018. Short-term receivables for these loans are recorded under Other short-term receivables and amounted to USD 6,400 in 2019 and USD 6,400 in 2018.

7. Non-current assets - Investments

Description	USD 2019	2018
Investment in iTeos Therapeutics, Inc. (iTeos)		
percentage owned and voting rights	n/a	n/a
Net investment at January 1	0	7,159,217
Reduction due to reclassification to non-current Financial Assets	0	(7,159,217)
Net investment at December 31 iTeos	**0**	**0**
Investment in Vaccitech Oncology Limited (VOLT)		
Share capital	1,313	0
Share premium	4,937,249	0
Cumulated results	(533,451)	0
percentage owned and voting rights	24.00%	n/a
Net investment at January 1	0	0
Share of capital and premium	1,185,254	0
Share of net loss	(128,028)	0
Net investment at December 31, VOLT	**1,057,226**	**0**
Miscellaneous investments	527	527
Total investments at December 31	**1,057,753**	**527**

The investment of iTeos Therapeutics, Inc. has been reclassified to Financial assets (see also Note 6). During 2018, a new financing round of USD 75 million from 3rd party investors was completed and as a result, the Institute's ownership interest of the shares dropped below 20%.

On January 16, 2019, the Institute entered into an investment agreement with Vaccitech Limited, Oxford, United Kingdom (Vaccitech) and Vaccitech Oncology Limited, Oxford, United Kingdom (VOLT). Vaccitech is an Oxford-based biopharmaceutical company which holds certain intellectual property rights relating to a platform technology which is developing for several therapeutic and prophylactic indications in humans and animals. Vaccitech has licensed intellectual property rights associated with viral vectors for use within the field of oncology to VOLT. The objective of this collaboration is to translate the evaluation of the cancer vaccine checkpoint combination into clinical trials with cancer patients whose tumors expressing MAGE-A3 and/or NY-ESO-1 antigens, to determine the safety and efficacy of the immunotherapy combination. The original investment was USD 2,999,641. An amount of USD 1,942,414 was recognized as Loss on financial assets & investment in the Income Statement to represent the Institute's actual share on the equity of VOLT.

With respect to miscellaneous investments in which the Institute holds at least 20%, the following information is provided:

i. The nominal share capital of Recepta Biopharma S.A., Sao Paulo, Brazil, is BRL 1,000.The company conducts medical research and develops, produces and commercializes humanized antibodies for the diagnosis of human cancer. The Institute holds 26.1% of the shares and of the voting rights.

ii. In order to administer intellectual property assets in areas other than cancer, in 2010 the Institute founded Ludwig Technologies, Inc., Delaware, USA. The nominal share capital is USD 100. Ludwig Technologies, Inc. holds 14.05% of the shares and of the voting rights in the company Extended Delivery Pharmaceuticals, LLC, Connecticut, USA. This biotechnology company is developing a long-acting type of insulin.

iii. In 2010 the Institute entered into a joint venture with The Cancer Research Institute, New York, USA, and formed the company Cancer Vaccine Acceleration Company, LLC, Delaware, USA. The purpose of the company is to identify novel opportunities for the development of cancer vaccine and immunotherapy and to obtain, hold and develop intellectual property. The nominal share capital is USD 200, of which the Institute holds 50% of the shares and of the voting rights.

8. Tangible fixed assets

During the years ended December 31, 2019 and December 31, 2018, the purchase of equipment and other assets and expenditure on leasehold improvements, amounting to USD 987,705 and USD 994,884 respectively, was expensed in the year of acquisition. Receipts arising from the disposal of equipment & other assets amounting to USD 1,552 and USD 41,376 respectively were credited in full to Other operating income.

9. Forward currency contracts

The Fund entered into forward contracts in order to hedge their exposure to changes in foreign currency rates on their assets and liabilities denoted in foreign currencies. In 2019 and 2018 unrealized gains of USD 1,673,368 and USD 114,245 and unrealized losses of USD 436,554 and USD 177,043 respectively, arose from contracts open at year end. They are included in the Current assets - Financial assets with respect to the Fund, and in Other short-term liabilities with respect to the Institute. They represent the changes in fair value of the contracts from the time of the Fund's and the Institute's conclusion of the contracts.

The notional values of the forward foreign currency contracts held by the Fund and the Institute translated at the relevant year-end exchange rates were as follows:

	USD	
Description	2019	2018
Forward currency purchases	49,720,464	13,661,598
Forward currency sales	50,957,277	13,598,800

10. Pension Schemes

Pension schemes have been established at all Institute locations.

The consolidated annual cost of the employer's contributions in 2019 and 2018 for all plans amounted to USD 2,003,300 and USD 2,336,734 respectively and is accounted for as Salaries & social benefits.

The following table shows all the pension schemes for which information is required under Swiss GAAP FER 16. All amounts are in thousands:

USD	Deficit 31.12.19	Share of Commit-ment* 31.12.2019	Share of Commit-ment* 31.12.2018	Net Change in Commit-ment	Contri-butions 2019	Total Income / (Expense) 2019	Total Income / (Expense) 2018
LGI Qualified plan (USA)	(4,233)	(4,233)	(2,337)	(1,896)	0	(1,896)	(770)
LGI Supplemental plan (USA)	(8,211)	(8,211)	(7,372)	(839)	(127)	(966)	(84)
AXA Foundation for Occupational Benefits (CH)	N/A	0	0	0	(330)	(330)	(410)

* Economic commitment

In **Switzerland**, the Institute operates a scheme with the AXA Foundation for Occupational Benefits (AXA) for staff employed in Switzerland.

In **Belgium**, a scheme was in place during 2019 and 2018 providing target benefits upon retirement to staff at the Brussels Branch. The plan is administered by and funds are invested with the AG Insurance Company, Brussels. The insurance company recalculates the contributions to be paid to finance the target pension benefits on an annual basis. A new plan was introduced per January 1, 2018, for personnel joining the Institute thereafter. This plan is based on defined contribution and administrated with the AG Insurance company as well.

In **Stockholm**, the Institute operated the Optional ITP Plan 1, a defined contribution scheme, the Optional ITP Plan 2, a defined benefit scheme and the SPP Alternative ITP plan, a defined contribution scheme, with the SPP Life Insurance Company. The plans covered different types of income classes. For the defined benefit schemes the insurance company recalculated the contributions to be paid to finance the target pension benefits on an annual basis.

In the **United Kingdom**, the Institute is a registered employer with the Universities Superannuation Scheme (the USS scheme) which, under the defined benefits section, sets the level of contributions based on the advice of the scheme's actuary. The main employer is Universities UK. In view of the size of the scheme and the Institute's limited participation in the management of the scheme, this scheme is treated as a defined contribution scheme. The last triennial actuarial valuation took place on March 31, 2018, and this showed, under the Technical Provisions basis as required by the UK Pensions Regulator, a funding level of 89%. Taking account of the underfunding of the scheme, various changes to the benefit structure are under discussion between the main employer and representatives of the members, the University and College Union. As the Institute has less than 20 active staff members in the scheme, it is not party to the consultation process. It is foreseen that the Institute's financing of the scheme is expected to continue at the employer contribution rate of 18% of the salary.

Following legislation introduced in the United Kingdom in September 2005, special provisions apply in the event of either an employer winding up a pension scheme or causing a cessation event to occur as a registered employer of a multi-employer pension scheme. In these cases, the employer is required to make additional funding available to buyout all liabilities with an insurance company (defined either as "buyout-debt" or "Section 75 debt") or, for multi-employer schemes with continuing indirect participation, to enter into an approved withdrawal agreement (AWA). Subject to agreement with the trustee of the pension scheme and the pension regulator, under an AWA, a guarantee is to be provided by the employer to the trustee of the pension scheme and the additional

funding requirement is deferred until the trustee requires it to be paid or the scheme commences wind-up.

The Institute's Board of Directors has reviewed the position taking into account the various on-going employment situations in the United Kingdom. As the USS scheme continues to have active members, and it is intended to retain the scheme for active members, the Board has concluded that there is no need to make provision for buyout-debt as at December 2019 and 2018.

In the event that a buyout-debt liability would be incurred for the USS scheme in the United Kingdom, the cost thereof, based on information provided by the scheme representative using the last triennial valuation as of March 31, 2018 and current estimation as of end of 2019, is estimated to be GBP 6.9 million (USD 9.1 million) and GBP 6.9 million (USD 8.7 million) as at December 31, 2018.

In the **United States of America**, the Institute operated The Ludwig Institute for Cancer Research Retirement Savings Plan (the LICRRS Plan). The LICRRS Plan is organized under Section 403(b) of the Internal Revenue Code and is a defined contribution scheme.

The total of short-term liabilities related to pension schemes is set out in Note 11.

In the **United States of America**, The Ludwig Group Inc. (LGI), a wholly owned subsidiary of UTI, maintained both a qualified and a supplemental retirement plan. LGI did not make any contributions to the qualified plan in 2019 or 2018, nor does it expect to make any contributions in 2020. In the supplemental plan, contributions of USD 126,762 were paid in 2018 and USD 126,762 in 2017. Benefits of USD 1,398,455 in 2017 and USD 1,433,249 in 2017 were paid out in respect of both plans. The qualified plan is funded and the supplemental plan is unfunded. The long-term provisions in respect of the two LGI plans are set out in Note 15.

11. Other short-term liabilities

	USD	
Description	2019	2018
Other short-term liabilities to third parties	551,892	1,450,888
Other short-term liabilities to pension funds	21,332	19,067
Other short-term liabilities to governing bodies	0	7,664
Total other short-term liabilities	**573,224**	**1,477,619**

12. Short-term provisions

USD	Tax related	Other	Total
Provisions as per December 31, 2017	3,140,747	92,821	3,233,568
Additions	0	0	0
Utilizations	0		0
Release of provisions	0	(79,580)	(79,580)
Currency adjustments	(18,953)	(13,241)	(32,194)
Provisions as per December 31, 2018	**3,121,794**	**0**	**3,121,794**
Additions	0	0	0
Utilizations	0	0	0
Release of provisions	0	0	0
Currency adjustments	52,679	0	52,679
Provisions as per December 31, 2019	**3,174,473**	**0**	**3,174,473**

Tax related
The Institute is registered for Value Added Tax (VAT) in Switzerland.

During 2017, the Institute was invoiced for an amount of CHF 3,762,506 (USD 3,847,930) by the Swiss Federal Tax Administration with respect to the amounts claimed by the tax authorities for the years 2007 to 2009.

Of this amount, CHF 2,769,717 (USD 2,832,601) was in respect of VAT claimed by the Swiss Federal Tax Administration for the years 2007 to 2009 and CHF 992,789 (USD 1,015,329) was in respect of interest charged on the tax claimed. The Institute settled the amounts invoiced under reservation, noting that the Institute continues to dispute the claims. The total payment is recorded in the books under Other short-term receivables.

Following a reassessment by Institute Management in 2017 of the claims made by the Swiss Federal Tax Administration, it was decided to release the provision in the amount of CHF 398,000 (USD 398,838) from the Tax related provision brought forward from 2016. A total provision of CHF 3,104,000 (USD 3,174,473) continues to be retained with respect to the claims made regarding the years 2007 to 2009.

Other
Various claims have been made by current and former staff against the Institute. Some of the claims have resulted in court filings in early 2020. Institute management disputes the claims made and continues to contest them vigorously. For the purposes of preparing the financial statements, management has carried out an assessment of the claims made giving due consideration to the various potential outcomes. As a result, no additional provisions have been made in the financial statements.

13. Deferred income

Description	USD 2019	2018
Deferred income at January 1	14,582,841	16,778,023
Usage of deferred income	(11,688,260)	(9,211,857)
Additional deferred income	7,525,931	7,016,675
Deferred income at December 31	**10,420,512**	**14,582,841**
Net change in restricted funds	**(4,162,329)**	**(2,195,182)**

In accordance with the provisions of Swiss GAAP FER 21, all changes in deferred income (restricted funds) are shown gross in the captions External funding and Net change in restricted funds in the Consolidated Statement of Income and Expenditure (see Note 2, Accounting policies and valuation standards - External funding).

14. Other long-term liabilities

Description	USD 2019	2018
US 457(b) Pension plan	1,478,955	1,156,938
Other long-term liabilities - third parties	0	351,079
Total other long-term liabilities	**1,478,955**	**1,508,017**

The US 457(b) Pension plan, a non-qualified, tax advantaged deferred compensation retirement plan, is available to some Institute employees in the United States. The Institute provides the plan and the employees defer compensation into it on a pre-tax basis. The total liability includes the return on investment credited to the employee accounts and is offset by a respective financial asset (see Note 6 Non-current assets – Financial assets).

15. Long-term provisions

Long-term provisions relate to the two Ludwig Group, Inc. (LGI) pension plans as described in Note 10.

USD	Total	Supplemental plan	Qualified plan
Provisions as at December 31, 2017	8,981,685	7,414,618	1,567,067
Additions	2,125,526	84,187	2,041,339
Utilizations	(1,398,455)	(126,762)	(1,271,693)
Provisions as at December 31, 2018	**9,708,756**	**7,372,043**	**2,336,713**
Additions	4,102,448	965,085	3,137,363
Utilizations	(1,367,655)	(126,762)	(1,240,893)
Provisions as at December 31, 2019	**12,443,549**	**8,210,366**	**4,233,183**

16. Directors' emoluments

Emoluments consist of (i) Directors' fees, (ii) Salaries and social benefits, and (iii) Other remuneration. Directors' fees were paid by the Institute and the Fund; Salaries and social benefits were paid by the Institute and LGI and other remuneration was paid by the Institute.

	USD	
Description	2019	2018
Directors' fees	314,235	335,230
Salaries & social benefits	1,929,590	1,977,662
Other remuneration	200	11,378
Total emoluments	**2,244,025**	**2,324,270**

In 2019 and 2018, the President of the Institute and the Fund and the Institute's Scientific Director received salaries and social benefits but did not receive director's fees. The Chairperson and the remaining members of the two Boards received director's fees but did not receive salaries nor social benefits. Two members of the Board of Directors received other remuneration in 2019 and 2018.

The remuneration of the two Boards of Directors, the Chairperson of the two Boards, the President of the Institute and the Fund and the Institute's Scientific Director are subject to review by the Institute's and the Fund's Compensation Committees, respectively.

Salaries are benchmarked against objective, third party comparable levels of compensation for fairness and reasonableness. The individual levels of Directors' fees have remained unchanged since 1998.

As at December 31, 2019, the Boards of the Institute and the Fund each had nine members plus an emeritus board member; at December 31, 2018, each board had eight members plus an emeritus board member.

17. Taxes

As a foreign entity, UTI is not subject to U.S. income taxes. The income tax provision relates to taxes for LGI, which conducts its operations in the United States. LGI's pre-tax income was approximately USD 192,000 in 2019 and USD 506,000 in 2018.

On December 22, 2017 the U.S enacted the Tax Cuts and Jobs Act (Tax Reform) into law, which reduced the federal income tax statutory rate from 34% to 21% effective January 1, 2018. For the year ended December 31, 2018, the effective rate of LGI's income tax provision differed from U.S. federal statutory rate of 21% primarily due to the effects of state and local income taxes.

As of December 22, 2018, the Company has completed its accounting with respect to U.S. Tax Reform and incorporated the new Tax Reform provisions effective for the year ended December 31, 2018. The Company has determined that the Global Intangible Low-taxed Income (GILTI) provision and Base Erosion and Anti-abuse Tax (BEAT) provision are not applicable to the Company. The other new provisions including limitations on interest expense deductibility, limitations on meals and entertainment deductions, and bonus depreciation had immaterial impacts to the Company's income tax provision.

18. Other related party transactions

The Institute is a party to a Research Collaboration and License Agreement with Vaccitech Oncology Limited. In 2019, income from cost recovery amounted to USD 11,906. In 2018, Vaccitech was not yet a related company and no such agreement existed.

19. Lease commitments, collaborative research and member contracts

All such commitments not recorded in the Balance Sheet, with a notice period of three months or more, are set out by year below:

	USD	
Description	2019	2018
2019	0	31,025,953
2020	32,402,715	30,833,735
2021	32,547,885	29,565,604
2022	32,945,209	29,603,953
2023	6,394,729	4,322,881
2024	2,263,835	197,233
2025-2030	178,400	178,400
Commitments not recorded in the Balance Sheet	**106,732,773**	**125,727,759**

20. Internal control system and annual risk assessment

The Institute's and the Fund's management are responsible for the design, operation and maintenance of the system of internal control (ICS). The Institute's and the Fund's Boards of Directors are ultimately responsible for the identification and assessment of risks, definition of the ICS framework and monitoring of management actions to ensure the adequacy and effectiveness of the control environment. The Institute's and the Fund's system of internal control over financial reporting is based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission and is designed to provide reasonable assurance regarding the preparation and fair presentation of published financial statements in accordance with generally accepted accounting principles in Switzerland / Financial Reporting Standards – Swiss GAAP FER.

The Institute and the Fund have adopted a risk-based approach to internal control and accept that it is neither possible nor cost effective to build a control environment that is risk free. Accordingly, the system of internal control in place is designed to manage rather than to eliminate risk. The system of internal control is an on-going process designed to identify the principal financial reporting risks, to evaluate the nature and extent of those risks and to manage them efficiently.

In 2019, the Institute's and the Fund's managements conducted risk assessments of the key processes already documented in the form of process flowcharts. Risks within those key processes were identified and evaluated as to their likelihood and impact based on predefined scales, incorporating quantitative and qualitative criteria. For each of the identified risks, the risk level was calculated as a multiple of the likelihood and impact. Top risks for each process were identified based on their respective risk level and classified further as financial reporting or operational risks. Key controls were defined and implemented to mitigate those top financial reporting risks. Non-financial reporting risks are considered to be outside of the ICS and are addressed through other policies and procedures.

The Institute's and Fund's managements assessed the effectiveness of the ICS over financial reporting during the year under review and reported thereon to the Institute's and Fund's Audit Committees.

The respective Audit Committees have the delegated responsibility to oversee the development and operation of the internal control system, to receive reports from the Risk and Compliance Officer and External Auditors, to review the internal control system documentation and to agree to any actions necessary to implement recommended improvements. The Audit Committees received reports from the Institute's Risk and Compliance Officer with regard to the ICS at all of their respective meetings during the year.

The Boards of Directors of the Institute and the Fund assessed the effectiveness of the ICS for financial reporting throughout the year and believe that the ICS for financial reporting was properly in effect as of December 31, 2019.

As part of the system of internal control, the internal audit function continued to operate and verify the adequacy and effectiveness of internal controls, carry out work to test the controls and provide reports to the two Audit Committees. The operations of the Zurich Office and Oxford Branch were reviewed by internal audit during 2019 and reports were submitted to the Institute's Audit Committee.

Risk assessments are carried out on an annual basis by the Risk and Compliance Officer reporting to the Audit Committees. They are based on annual self-reassessment of risks and controls by the ICS process owners, information obtained through interviews of the Institute's and the Fund's management and key personnel and further evaluation and testing of controls when carrying out internal audits.

21. Approval of the consolidated financial statements

The consolidated financial statements of the Ludwig Institute for Cancer Research Ltd as at December 31, 2019, together with the Report of the Auditors, dated May 22, 2020, are hereby submitted to the General Meeting of Shareholders.

22. Subsequent events

On March 11, 2020, the World Health Organization declared the outbreak of the Coronavirus disease (COVID-19) to be a pandemic. With over 185 countries/regions now affected and governments taking increasingly stringent steps to help contain or delay the spread of the virus, there is a significant increase in economic uncertainty, evidenced by more volatile asset prices and currency exchange rates, among others.

Management assessed the pandemic's impact on research activity and availability of funding and liquidity, concluding that from today's point of view and assuming markets do not further weaken the Institute will be able to support the current level of activity going forward and continue as a going concern for more than 12 months.

There are no other subsequent events to report, which might have a material impact on the consolidated financial statements.

PERFORMANCE REPORT

Purposes of the organization

The Ludwig Institute for Cancer Research Ltd (the Institute) is an international not-for-profit organization with a 48-year legacy of pioneering discoveries relating to cancer. The Institute provides its scientists around the world with the resources and the flexibility to realize the life-changing potential of their work and advance their discoveries for the benefit of human health. This philosophy, combined with robust translational programs, maximizes the potential of breakthrough discoveries.

The Institute conducts its own basic cancer research as well as clinical trials, making it a bridge from the most basic questions of life to the most pressing needs of cancer care. Since its inception, the Institute has invested USD 2.1 billion of its own resources and USD 0.7 billion from external funding in cancer research. Internal support for its research comes from an investment pool valued at around USD 1.6 billion. This investment portfolio is held and managed by LICR Fund, Inc. (the Fund).

The Institute now has around 550 Full Time Equivalent scientists, clinicians, postdoctoral fellows, students and support staff located in four countries who are focused on multiple aspects of cancer research. The Institute is part of the larger Ludwig Cancer Research (Ludwig) community, which also includes the Ludwig Centers at six U.S. institutions, all pursuing breakthroughs to alter the course of cancer.

The Institute’s research activities are principally organized through Branches. Each Branch occupies defined space and functions in close association with a local university, research institute and / or not-for-profit hospital. A number of individual investigators, laboratories and centers complement the Institute's Branches through a wide range of collaborative research programs, thereby extending the international reach and research footprint of the Institute.

External Funding

The Institute continued to attract significant external funding to support its core research programs.

In 2019, the Institute recorded income of USD 12.8 million from industrial and philanthropic resources and USD 7.7 million from Government sources. The total income of USD 20.5 million was 2.4% lower than the 2018 amount received of USD 21.0 million. Although there were substantial increases, namely from the Fondation des Fondateurs, Zurich, Switzerland, of USD 2.0 million, and the Cancer Research Institute, New York, USA, of USD 1.5 million, there are a number of funding sources that have decreased due to the anticipated end of collaborations. These include the Hilton Foundation, Los Angeles, USA, with USD 2.0 million, the Amyotropic Lateral Sclerosis Association (ALSA), Arlington, USA, with USD 0.5 million and Boehringer Ingelheim International, Ingelheim, Germany, with USD 0.5 million. The general decrease is mainly due to wind-down activities for the clinical trials program.

The five highest providers of external funding to the Institute were as follows:

US National Institutes of Health (USD 7.3 million), the Cancer Research Institute, New York, USA (USD 3.4 million), the Fondation des Fondateurs, Zurich, Switzerland (USD 2.0 million), the Université Catholique de Louvain, Brussels, (USD 1.3 million) and the University of California, San Diego, USA (USD 1.3 million).

Segment reporting

The total operating expenses of USD 91.9 million in 2018 and USD 103.0 million in 2017 consist of the following segments:

	million USD			
Description	2019	2018	Variance	% of total 2019
Branch and laboratory expenditure				
San Diego (including SMD*)	27.7	29.2	-1.5	31%
Lausanne	8.2	7.6	0.6	9%
Oxford	7.1	5.8	1.3	8%
Brussels	4.6	4.8	-0.2	5%
Uppsala	0.0	2.2	-2.2	0%
Stockholm	0.2	0.9	-0.7	0%
Sao Paulo	0.4	0.1	0.3	0%
Total Branch Expenditure	**48.2**	**50.6**	**-2.4**	**54%**
Non-Branch expenditure				
Clinical Trials	11.1	12.2	-1.1	12%
Programs	9.4	7.9	1.5	11%
Intellectual property	2.1	2.1	0.1	2%
Fund management	7.0	7.5	-0.4	8%
Administration	11.4	11.7	-0.3	13%
Total Non-Branch Expenditure	**41.1**	**41.3**	**-0.2**	**46%**
Total Institute	**89.2**	**91.9**	**-2.7**	**100%**

*Small Molecule Discovery Group

Not-for-profit reporting

The Institute and the Fund prepare, by entity, various statistical and information returns which require analysis of expenditure between i) program service, ii) management and general and iii) grant writing costs.

Using this analysis, on a consolidated basis, for the year 2018 (the latest year where analysis data is currently available), total expenditure of USD 91.3 million is analysed as program service expenditure - USD 71.2 million (78%); management and general expenditure - USD 18.4 million (20%); and grant writing expenditure – USD 1.7 million (2%).

For 2017, total expenditure of USD 103.7 million is analyzed as program service expenditure - USD 79.2 million (76%); management and general expenditure - USD 22.7 million (22%) and grant writing expenditure - USD 1.8 million (2%).

Managing bodies and senior staff

The Statutes and By-laws of the Institute determine the responsibilities and the authority of the following organs of the company:

The Board of Directors
Management, comprising the Executive Officers and Branch Directors.

The Board is elected at the General Meeting of Shareholders held each year in June for a one-year term of office. The members of the Institute's Board of Directors are automatically members of the Board of Directors of the Fund.

The individuals who served as members of the Board of Directors of both the Institute and the Fund during 2019 were as follows: John L. Notter (Chairperson); Chi Van Dang, MD, PhD; Nancy Ellen Davidson, MD; Olivier Dunant; John D. Gordan III; Alexandra C. Johnson (appointed September 2019); Judge Barbara S. Jones; Edward A. McDermott Jr. and Philip A. Pizzo, MD. Alexander Borissov was the Secretary to the Board.

The Executive Officers of the Institute constitute its management and consisted of the President, the Scientific Director, the Deputy Scientific Director, the Executive Vice-President for Technology Development and the Chief Financial Officer.

These posts were held as of December 31, 2019, by the following individuals:

President	Edward A. McDermott Jr.
Scientific Director	Chi Van Dang, MD, PhD
Deputy Scientific Director	Robert L. Strausberg, PhD
Executive Vice-President for Technology Development	Jonathan C.A. Skipper, PhD
Chief Financial Officer	Thomas Bänninger

The Executive Officers were supported by:

Vice-President for Human Resources	Kimberly McKinley-Thomas
Vice-President for Intellectual Property	Pär Olsson, PhD
Vice-President for Communications	Rachel Reinhardt
Vice-President for Clinical Trials Management and Chief Medical Officer	Ralph Venhaus, MD

The Institute has a Scientific Advisory Committee that provides advice to the Scientific Director on scientific matters, as well as the review of scientific staff. As of December 31, 2019, the Scientific Advisory Committee was composed of: Philip D. Greenberg, MD, Victor Velculescu, MD, PhD, Karen H. Vousden, PhD, and W.K. Alfred Yung, MD. Robert L. Strausberg, PhD, was the Secretary to the Scientific Advisory Committee.

The Branches are each managed by a Director who is responsible for the scientific program, as well as the administration of the Branch.

The leadership of the Institute's Branches as of December 31, 2019 was as follows:

Lausanne	George Coukos, MD, PhD
Oxford	Xin Lu, PhD
San Diego	Jonathan C.A. Skipper, PhD

Some Executive Officers, Branch Directors and other senior staff members hold academic positions within the host institutions with which the Institute is associated.

Results of work on Institute research programs in 2019

Scientific Publications

Laboratory and clinical research to further the prevention, early detection, understanding and control of cancer is conducted at the Institute's Branches and through collaborations with other institutions. In 2019, progress was made in the study of tumor biology, cancer genomics, cancer prevention, the tumor microenvironment and tumor immunology.

The Institute is committed to prompt and active dissemination of its research results. In the year 2019, the publication record by location was as follows:

	Primary Research Articles	Reviews/ Book Chapters/ Commentaries	Total
Brussels	19	3	22
Lausanne	55	28	83
NY Collaborative Laboratory	20	3	23
Oxford	51	7	58
San Diego	63	8	71
Sao Paulo	9	0	9
Total	**217**	**49**	**266**

Clinical Trials

Eight Institute-sponsored clinical trials were on-going in 2019. Institute investigational study agents were provided for an additional three active clinical trials sponsored and managed by local entities. These eleven trials, together with 17 previously completed studies, were supported by 14 active Institute regulatory dossiers [eight Investigational New Drug (IND) applications (USA), one Drug Master File (DMF), two Clinical Trial Applications (CTA) in Switzerland and in the UK, respectively, and three Clinical Trial Notifications (CTN) in Australia]. Over the year, the Institute made no new regulatory submissions and 83 supplemental submissions to its active regulatory dossiers in three countries.

Clinical Trial Sites
The following sites had active Ludwig Institute-managed trials in 2019:

Australia
- Austin Hospital, Melbourne, VIC, Australia

Switzerland
- Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland

United Kingdom
- Churchill Hospital, Oxford, United Kingdom
- Coventry University Hospital, Coventry, United Kingdom
- Ninewells Hospital, Dundee, Scotland, United Kingdom
- Nottingham City Hospital, Nottingham, United Kingdom
- Southampton General Hospital, Southampton, United Kingdom

North America
- Arizona Oncology, Phoenix, AZ, USA
- Banner MD Anderson Cancer Center, Gilbert, AZ, USA
- Cleveland Clinic, Cleveland, OH, USA
- Dana-Farber Cancer Institute, Boston, MA, USA
- Dartmouth-Hitchcock Cancer Center, Lebanon, NH, USA
- Emory Hospital, Atlanta, GA, USA
- H. Lee Moffitt Cancer Center & Research Institute, Tampa, FL, USA
- Johns Hopkins University, Baltimore, MD, USA
- Mary Crowley Cancer Research, Dallas, TX, USA
- Massachusetts General Hospital, Boston, MA, USA
- Medical College of Wisconsin, Milwaukee, WI, USA
- Memorial Sloan-Kettering Cancer Center, New York, NY, USA
- Mount Sinai Hospital, New York, NY, USA
- New York University, New York, NY, USA
- Ohio State University Medical Center, Columbus, OH, USA
- Roswell Park Cancer Institute, Buffalo, NY, USA
- Stanford University, Stanford, CA, USA
- University of California (UCLA), Los Angeles, CA, USA
- University of California (UCSF), San Francisco, CA, USA
- University of Miami, Miami, FL, USA
- University of Toledo, Toledo, OH, USA
- University of Virginia, Charlottesville, VA, USA
- Washington University, Saint Louis, MO, USA
- Women and Infants Hospital, Providence, RI, USA
- Yale University, New Haven, CT, USA

Technology Development

One of the main objectives of the Institute is to bring its scientific discoveries to public benefit as quickly and effectively as possible. Given that the significant costs involved in drug development are far beyond the resources available to it, the Institute enters into research, development and licensing agreements with commercial drug development organizations having the financial, management and technological resources necessary to develop Institute discoveries for diagnostic and therapeutic purposes.

To facilitate this work, the Institute has established a comprehensive patent protection and licensing capability. Several new patents were issued and technology licenses completed this past year. In 2019, ten new U.S. patents, three new European patents and one U.S. trademark were issued, and nine new U.S. applications and a further five new international patent applications were filed. In addition, the Institute was party to 188 license, sublicense and option agreements with commercial organizations at the start of 2019. During the year, an additional 15 agreements were implemented while ten agreements either expired or were terminated. At the end of 2019, the Institute's portfolio comprised a total of 193 agreements. The majority of these license agreements allow companies to commercialize Institute reagents or products derived from such technologies for laboratory research purposes, as companion diagnostic candidates or for a company’s own in-house commercial research. A subset of these agreements grant rights to commercial companies using Institute discoveries for the development of therapeutic and diagnostic products. These programs remain at various stages of product development, from pre-clinical testing to phase 1, 2 and 3 clinical trials. Sargramostim (or Leukine), a recombinant granulocyte macrophage colony-stimulating factor (GM-CSF) used for myeloid reconstitution after bone marrow transplantation or neutropenia induced by chemotherapy, is a marketed product derived from Institute research.

Cancer immunotherapy continues to be a focus of the Institute’s translational and clinical research, as reflected in the patents issued and filed by the Institute and its partners. Over the past year, the Institute has filed several new patent applications claiming novel constructs and cell expansion methodologies applicable to the design and development of innovative cellular therapies. In addition, the discovery and patenting of new genomic and epigenetic insights and related technologies reflects the Institute’s established expertise in the field and an emerging focus in seeking useful applications for its genomics technologies and know-how.

Checkpoint antibody immunotherapies targeting PD-1/L1 and CTLA-4 have resulted in significant improvements in disease outcome in a subset of cancer patients. However, the majority of advanced stage patients do not respond or subsequently relapse following treatment with existing checkpoint immunotherapies, so continued research with these or complementary immune modulatory agents remains a critical research endeavor. In this context, the Institute has ongoing clinical research collaborations with several pharmaceutical and biotechnology companies including Medimmune/ AstraZeneca, Bristol Myers Squibb, Boehringer Ingelheim, CureVac, Oncovir and Targovax, together with the Cancer Research Institute, New York (CRI). These collaborations involve clinical studies evaluating PD-1/L1 drugs in combination with additional novel therapeutics or standard therapies to improve therapeutic outcomes for cancer patients. During 2019, the Institute was sponsoring eight active clinical trials, with four clinical trials enrolling patients.

In 2019, the Institute established an oncology focused strategic collaboration with T cell immunotherapy company Vaccitech Oncology Limited (Oxford). Utilizing Vaccitech’s proprietary CD8+ T cell induction platform and complementary research and intellectual property from the

Ludwig Oxford Branch validating this platform with MAGE and NY-ESO-1 cancer antigens, a novel cancer vaccine VTP-600 has been manufactured and will be evaluated in combination with immune checkpoint blockade in cancer patients. A new clinical collaboration with Cancer Research UK (CRUK) was established, whereby CRUK will undertake the clinical development of VTP-600 immunotherapy as a treatment option for patients with non-small cell lung cancer.

The Institute's research and technology development activities have resulted in the generation of additional novel immune checkpoint antibodies, which are currently in clinical development. The checkpoint antibodies Balstilimab (AGEN2034) and Zalifrelimab (AGEN1884), targeting PD-1 and CTLA-4 respectively, originated from the Institute's research collaboration with Agenus Inc. In clinical studies, both antibodies were well tolerated and the recommended phase 2 dose for each antibody was identified. An ongoing randomized, phase 2 clinical trial of Balstilimab in combination with Zalifrelimab in second line cervical cancer completed planned accrual and planned interim analysis in 2019. An additional phase 2 clinical study of Balstilimab in cervical cancer patients was also expected to complete its planned accrual and planned interim analysis. Agenus is also developing a second generation, Fc engineered anti-CTLA-4 antibody (AGEN1181) that is a modified version of AGEN1884 with improved biological activity and potential clinical benefit. A phase 1 clinical study of AGEN1181 was initiated in 2019. Following completion of the dose escalation part of the study, the trial was expanded to include cancer patients dosed with the combination of AGEN1181 and anti-PD-1 antibody Balstilimab.

Agenus has also granted UroGen Pharma Ltd. a worldwide license to develop and commercialize zalifrelimab through intravesical delivery in combination with UroGen's UGN-201 (TLR-7/8 agonist) for the treatment of urinary tract cancers such as high-grade non-muscle invasive bladder cancer (HG NMIBC).

Novel checkpoint agonist antibodies INCAGN01876 (anti-GITR), and INCAGN01949 (anti-OX40) originated from the Institute's research collaboration with Agenus. These are being developed by Incyte and are being evaluated in ongoing phase 1/2 clinical trials as single agents and in combination studies with Nivolumab (anti-PD1) and Ipilimumab (anti-CTLA-4).

Ludwig start-up company iTeos Therapeutics, Inc. (iTeos) is dedicated to the development of immuno-oncology therapies targeting the tumor microenvironment. In 2019, iTeos launched a phase 1 clinical trial of its lead cancer immunotherapy program EOS100850, an adenosine A2A receptor antagonist. In addition, iTeos has entered into an agreement with Merck to evaluate EOS100850 in combination with Keytruda (pembrolizumab), the leading anti-PD-1 therapy. A phase 1/2 clinical trial in patients with multiple solid tumors is expected to begin enrollment in early 2020.

TGF-β is increasingly recognized as a key mechanism of immune system evasion and resistance to checkpoint blockade (anti-PD/L1) therapy. To gain better understanding of the contribution of the individual TGF-β ligands to this anti-tumor activity, the Institute has developed isoform specific anti-TGF-β monoclonal antibodies and shown that isoform specific blockade of active TGFβ1 enhanced the efficacy of checkpoint blockade in a preclinical breast cancer model (SITC 2019). An alternative approach to targeting TGF-β derived tumor immunosuppression involves targeting the GARP/latent TGF-β complex. Anti-GARP antibody (ARGX-115), developed by Ludwig investigators together with collaborators at the de Duve/UCL in Brussels and biotechnology company Argenx, was previously licensed to Abbvie (ABBV-151). In 2019, Abbvie launched a dose escalation, phase 1 clinical trial of ABBV-151 in cancer patients with solid tumors.

Monoclonal antibodies targeting antigens on the surface of tumor cells may be exploited therapeutically as antibody drug conjugates (ADCs) to deliver cytotoxic agents directly to the tumor cell. The ADC targeting glioblastoma (GBM) tumors with epidermal growth factor receptor amplification, depatuxizumab mafodotin, or Depatux-M (previously known as ABT-414 and derived from Ludwig's MAb806 anti-EGFR antibody), was being developed by Abbvie. In mid-2019, Abbvie announced the Phase 3 INTELLANCE-1 study of Depatux-M in patients with newly diagnosed GBM demonstrated no survival benefit for patients receiving Depatux-M at an interim analysis, and enrollment in ongoing Depatux-M studies was halted. However, Abbvie is continuing the clinical development of an alternative ADC utilizing a second generation affinity matured version of MAb806 (ABBV-321 or Serclutamab Talirine), which is being studied in a clinical trial in cancer patients with solid tumors.

Another ADC program is under development by the biotechnology company Mersana, which has launched a phase 1 clinical study for the clinical development of XMT-1536 (NaPi2b Dolaflexin ADC), an antibody drug conjugate based on the humanized MX35 antibody. The MX35 antibody was originally discovered by the Institute and developed in collaboration with Recepta Biopharma S.A.. In 2019, Mersana began dosing expanded cohorts of patients with platinum-resistant ovarian cancer and non-small cell lung cancer.

At the end of 2019, the Institute had holdings in seven start-up companies with products at various stages of development and maturity originating from licenses to Institute technology:

- Cancer Vaccine Acceleration Company, LLC, USA
- Extended Delivery Pharmaceuticals, LLC, USA
- iOx Therapeutics Limited, United Kingdom
- iTeos Therapeutics Inc., USA
- Life Sciences Pharmaceuticals, Inc, USA
- Recepta Biopharma S.A., Brazil
- Vaccitech Oncology Limited, United Kingdom

During 2019, the Institute sold its shares in Opthea Limited, the Premier Veterinary Group Plc and the Serametrix Corporation. Total gain on sales of these financial assets amount to USD 4,442,789. This amount is net after sharing with co-owners and inventors.

The gross income to the Institute from the commercialization of the Institute's technologies was USD 2.9 million in 2019. Significant contributions to the gross income were represented by royalty income from the sale of GM-CSF, plus the sales of numerous research reagents and kits namely from Melan-A (A103), CDNA Synthesis Technology, Anti-CD25 mabPC61 and 17A2mab anti murineCD3. Substantial sublicense income was received for the Anti-GARP antibody. The net income to the Institute after sharing with co-owners and inventors was USD 1.8 million.

Human Resources

An important aspect of the Institute's programs is the training of outstanding young scientists who will in time join a new generation of leading cancer investigators. During the year, seven PhD students started their postgraduate training with the Institute and ten completed their training with the Institute. At December 31, 2019, the Institute was sponsoring 42 postdoctoral fellows and 15 PhD students.

Awards and Distinctions

The quality of the Institute's investigators continued to be internationally recognized. The following awards and distinctions were received in 2019:

Brussels

Stefan N. Constantinescu, MD, PhD	Awarded Advanced Grant as Welbio Investigator
	Full Member of the Royal Academy of Medicine of Belgium
Benoit Van den Eynde, PhD	Awarded Continuation Grant as Welbio Investigator

Lausanne

Caroline Arber	Swiss Government Excellence Scholarship to Jan Rath (PhD student)
Michal Bassani, PhD	Recipient of the Molecular and Cellular Proteomics Lectureship Award, at the 13th International Symposium on Mass Spectrometry in the Health and Life Science, San Francisco, 2019
George Coukos, MD, PhD	Recipient of the Helga Salvesen Award at the ESGO meeting in Athens in November 2019
Ping-Chih Ho, PhD	Recipient of the Cancer Research Institute-CLIP investigator award
	Recipient of the EMBO Young Investigator award 2019
Johanna Joyce, PhD	EMBO fellowship granted to Angel Alvarez Prado (Postdoc) and Marta Jordao (Postdoc)
	Austrian Science Fund fellowship granted to Klara Soukup (Postdoc)
	HFSP fellowship granted to Leire Bejarano Bosque (Postdoc)
	AIRC fellowship granted to Matteo Massara (Postdoc)

Tatiana Petrova	HFSP fellowship granted to Jaeryung Kim (Postdoc)
Nicola Vannini, PhD	Recipient of the ISSCR merit award

Oxford

Mads Gyrd-Hansen, PhD	Awarded a Wellcome Trust Senior Research Fellowship
Sir Peter J. Ratcliffe, MD, FRS	Recipient of the Nobel Prize in Physiology or Medicine (with William Kaelin and Gregg Semenza)
	Elected to the Association of American Physicians

San Diego

Don W. Cleveland, PhD	Recipient of the 2019 Genome Valley Excellence Award, India
	Recipient of the 2019 Sean M. Healey International Prize for Innovation in ALS
Beata Mierzwa, PhD	Elected as an AAAS IF/THEN Ambassador