

Company overview:

Tekmira Pharmaceuticals is a leading RNA interference (RNAi) Therapeutics Company with more than 14 years of industry experience. The Company has good revenue potential via its pipeline of product candidates in development to treat serious human diseases such as cancer and viral infections like Hepatitis B and Ebola. Tekmira is advancing the development of novel drugs in areas where there is a significant unmet medical need and commercial opportunity and it also licences its leading RNAi delivery technology to partners around the world advancing their own pipeline of developmental drugs.

- (1) RNA interference (RNAi) is considered one of the most important discoveries in the field of biomedical science in the last decade as it has the potential to generate a new class of safer therapies that are more specific and effective.** It takes advantage of the body's own natural processes to silence genes and treat serious human diseases that often rely on the production of certain proteins at the genetic level. This method of treatment is not currently available with conventional drugs. In the cell, DNA carries the genetic info required to make each specific protein, genes are first copied or transcribed into RNA which is translated into protein. Most diseases are caused either the absence or over-production of a specific protein. **RNAi products can silence or eliminate the production of disease-causing proteins, creating opportunities for therapeutic interventions that are not possible with conventional drugs.** One method to target disease-causing proteins involves developing small interfering RNA (siRNA) molecules that are developed to suppress the production of proteins through the RNAi mechanism. siRNA-based therapeutics can bind to a target protein mRNA with great specificity resulting into suppressing this specific protein for long periods of time.
- (2) To realise the therapeutic potential effective delivery is critical. The Company's proprietary LNP Delivery Platform makes possible the successful delivery and enablement of RNAi as well as mRNA drugs.** Tekmira's Lipid Nanoparticle (LNP) technology represents the most widely adopted RNAi delivery technology to date, as it allows drugs to be encapsulated in tiny particles made of lipids which travel through the bloodstream to target tissues. LNPs are designed to stay in the circulation long enough to accumulate at disease sites and through a process called endocytosis, cells take up the LNPs which allows them to migrate into the cell. The LNPs then undergo an interaction within the cell and the siRNA drug is released mediating RNAi. This technology has a series of benefits that improve effectiveness of delivery. While it minimizes immunotoxicity and other undesired side effects. The Company has licenced its technology to Alnylam and Merck&Co with the former providing royalty bearing access to some of its partners. TKMR has an ongoing research relationship with Bristol-Myers Squibb Company, etc outside the field of RNAi they have a legacy licencing agreement with Spectrum Pharmaceuticals. **In addition to RNAi Tekmira's LNP delivery technologies can be used for mRNA molecules.** The mRNA molecules are large, fragile and easily degrade they do not readily cross plasma membranes to enter target cells and so a delivery solution is required.

Tekmira's third generation LNP technology demonstrates significant improvements over previous generations and potent mRNA delivery is readily achieved.

- (3) Tekmira has a number of drugs in its pipeline that are focusing on delivering drugs for rare diseases where the molecular target is found in the liver though their third generation liver centric LNP. TKM-PLK1 is currently in phase II trial and is targeting three different forms of cancer, while TKM-Ebola specialises in the Zaire species of Ebola virus. The Company has two areas of particular interest in its future research; glycogen storage diseases and rare forms of hypertriglyceridemia and is expecting to be in a position to identify another development candidate in 2014.

TEKMIRA PROGRAMS	Research	Preclinical	Phase I	Phase II	Phase III	APPROVED	Time
TKM - PLK1 - Oncology							Phase I started in Jan/11, Phase II in Aug 13, Phase II HCC trial in H1/14, GI-Net Phase II data in 2H14
TKM-Ebola - Ebola Virus Infection							
TKM-HBV - Hepatitis B (HBV)							Phase I to start 1H/15
TKM -ALDH2 - Alcohol Use Disorder							Proof of concept near completion, 2H14
TKM-Marburg - Marburg Virus Infection							
Rare Forms of Hypertriglyceridemia							
Glycogen Storage Disorder Type IV							

- **TKM-PLK1: PLK1 is an abbreviation for Polo Like Kinase 1 which is enzyme that in humans is encoded by the PLK1 gene and is being studied as a target for cancer drugs.** Inhibition of PLK1 expression prevents the tumour cell from completing cell division, resulting in cell cycle arrest and death of the cancer cell. By using an RNAi approach and exploiting its naturally occurring mechanism of action, Tekmira can potentially overcome the limitations of other approaches and effectively silence PLK1. The clinical trials have been conducted with patients who have **Gastrointestinal Neuroendocrine Tumours (GI-NET)**, **Adrenocortical Carcinoma (ACC)** and will soon begin a **Hepatocellular Carcinoma (HCC)**.
 - **GI-NET** – Refers to a group of usual and complex cancers that neuroendocrine cells arising in the gastrointestinal tract. It is estimated that there has been a four-fold increase in the incidence of NETs between 1973 and 2004. Approximately 55k people are living with GI-NET in the US. There is poor prognosis for advanced metastatic NETs, with 25% of patients surviving less than a year. Treatment of patients with GI-NET remains a challenge, and currently there are no approved anti-tumour drug treatments indicated specifically for GI-NET.
 - **HCC** – Primary liver cancer, or hepatocellular carcinoma is one of the most common cancers worldwide, with more than 630,000 people diagnosed each year. HCC represents a major unmet medical need and is associated with one of the poorest survival rates in oncology. This is in part because only 10-20% of hepatocellular carcinomas can be removed completely using surgery.
 - **ACC** – Is a rare cancer that forms in the outer layer of tissue of the adrenal gland. The adrenal gland is on top of each kidney that makes steroid hormones, adrenaline and noradrenaline to control heart rate, blood-pressure and other body functions. In most cases patients that have undergone treatment will develop recurrence because of the underlying tumor biology, so at the moment there is a lack of effective systemic therapies.

For the purpose of our analysis we assume that the cost of the PLK1 treatment could be up to \$20k annually and we expect the drug to hit the market no earlier than 2018.

- TKM-Ebola:** The Zaire species of Ebola virus, a highly contagious and lethal human infectious disease, has been associated with periodic outbreaks of haemorrhagic fever in human populations with mortality rates reaching 90% making it one of the most feared infectious diseases. At the moment there are no known cures or vaccines available. In March 5th 2014 the FDA announced they granted **Fast Track designation** for the development of TKM-Ebola, an anti-Ebola viral therapeutic. The drug is being developed under a \$140mn contract with the US. Department of Defense's Medical Countermeasure Systems BioDefense Therapeutics (MCS-BDTX) Joint Product Management Office. The FDA ascribed a fast track status to this drug as it is targeting an unmet medical need since there are no therapies available for acute Ebola infection. Additionally the haemorrhagic fever that Ebola infection confers is usually fatal and there have been tangible clinical benefits. The Fast Track status of this drug is highlighting its importance and confidence on future success but in no way does it guarantee approval status irrespective of the clinical trial results. However, **based on the results of preclinical studies on animals where the result was 100% protection from an otherwise lethal dose of the virus, we are confident that the results of the human clinical trial will assess the safety and effectiveness of the treatment.** The Ebola virus is transmitted from person to person through bodily fluids, humans first got the virus through contact with the bodily fluids of infected animals. According to WHO (World Health Organisation) fruit bats are considered natural hosts for Ebola. The mortality rate of the Ebola fever is up to 90% as infected individuals usually experience both internal and external bleeding as blood vessels start to leak, and is a matter of few days. However, what causes death is not intense bleeding but form viremia (virus enters the bloodstream and gains access to the rest of the body). *For the purpose of our analysis we assume that the cost of such treatment could be up to \$100k annually and we expect the drug to hit the market in 2016.*
- TKM-HBV** is focused on addressing Hepatitis B virus (HBV) surface antigen expression in chronically infected patients. This therapy could prove to be a significant opportunity for the Company given the size of the addressable market. Currently there are more than 350mn people infected globally with Hepatitis B Virus with the US having c.1.4mn chronically infected individuals. Small molecule nucleotide therapy is rapidly becoming the standard care for chronically infected HBV patients but many of them continue to express a viral protein called surface antigen. This protein can cause inflammation of the liver, leading to cirrhosis and some cases to hepatocellular cancer. TKM-HBV is designed to block the surface antigen and may also allow these patients the potential to raise their own antibodies against the virus, which could lead to a functional cure for the infection. TKM-HBV is developed as a multi-component RNAi therapeutic that targets different sites on the HBV genome and will employ a liver-centric- LNP formulation that is more potent than any LNP currently in clinical development. The Company is expecting to file an Investigational New Drug (IND) application in the second half of 2014, and also advance the therapy to chronically infected HBV patients. *For the purpose of our analysis we assume that the cost of such treatment could be up to \$5k annually and we expect the drug to hit the US market in 2020 and China approximately one year later.*

- **TKM – ALDH2** is a unique application of RNAi and is designed to knockdown the Aldehyde dehydrogenase 2 (ALDH2) enzyme to induce long term sensitivity to ethanol. By silencing this enzyme the levels of acetaldehyde are higher and that results into adverse physiological effects that cause individuals to avoid alcohol consumption. The Company has developed an extremely potent siRNA trigger combined with a third generation LNP. Although an ALDH2 inhibition drug already exists (Disulfiram) it has to be taken daily, while TKM-ALDH2 is expected to prolong ethanol sensitivity and overcome the limitations of patient compliance. The Company is expecting to complete preclinical work and file for IND in the second half of 2014, and hope for Phase 1 clinical trial data available in 2015. The drug will be developed in order to target patient population consisting of individuals who have moderate-to-severe alcohol use disorder and are pursuing treatment. Currently there are approximately 18mn people with an alcohol use disorder in the US, out of which 2mn seek treatment and c350th receive pharmacotherapy for alcohol use disorder.

For the purpose of our analysis we assume that the cost of such treatment could be up to \$5k annually and we expect the drug to hit the market not before 2018.

Apart from the pipeline products we described above the Company has a series of partnered products which we present on the table below:

PARTNER PROGRAMS	Research	Preclinical	Phase I	Phase II	Phase III	APPROVED
Marqibo - Adults Relapsed Leukemia (Spectrum)						Aug 12
ALN - TTR02 - TTR Amyloidosis (Alnylam)						
ALN - VSP - Liver Cancer (Alnylam)						
ALN - PCS - High Cholesterol (Alnylam)						
BMS - Target Selection						

Launched by Spectrum Pharma in 3Q13
Phase III trial started in 4Q13
Phase II testing in China in 2H13

Marqibo, is a liposomal formulation for the treatment of adult patients with relapsed Leukaemia (second or greater relapse) or whose disease has progressed following two or more anti-leukaemia therapies. The drug received accelerated approval from the FDA in 2012 and in 2013 Spectrum launched Marqibo through its existing haematology sales force. Tekmira is entitled to royalty payments based on the drug's commercial sales.

Alnylam's LNP-Enabled Therapeutics; There are currently three LNP-based products in clinical development ALN-TTR02, ALN-VSP, and ALN-PCS02 targeting amyloidosis, liver cancer and high cholesterol respectively. Alnylam has a licence to use Tekmira's intellectual property to develop and commercialise products and can also grant access to their LNP Delivery Technology to its partners as part of a product sublicense. As a result Alnylam will pay low single digit royalties as the drugs are developed and commercialised.

For the purpose of our analysis we assume that the vast majority of Alnylam's drugs will hit the market approximately on 2018.

Intellectual property

Tekmira has developed a series of expertise and in addition the Company owns a portfolio of patents and patent applications specific to LNP inventions, formulation and manufacturing of LNP-based pharmaceuticals, chemical modification of RNAi molecules and RNAi drugs and processes directed at particular disease indications. The Company has a portfolio of approximately 95 patent families in the US and abroad that are directed to various aspects of LNPs and LNP formulations. The portfolio includes approximately 72 issued US patents, 71 issued non-US patents and 229 pending patent applications.

Liquidity

The Company successfully completed a capital raising in March 2014 (\$56.9mn net proceeds) that secure the financing of a number of research projects that the Company has in early clinical and preclinical phase. Post the Capital

Competitors

The main direct competitors of Tekmira are listed below, the majority of these companies are active on the siRNA sector and have drugs mainly in early stages of clinical trials.

- **Dicema (DRNA US)** – the Company provides biopharmaceutical products. The Company discovers and develops ribonucleic acid interference drugs for the treatment of rare inherited diseases involving the liver and for cancers that are genetically defined. The Company IPO'd recently (total proceeds of \$92.9mn) and is a siRNA formulation developer.
- **Arrowhead Research Corporation (ARWR US)** – is conducting research projects in the area of the development of nanotechnologies and applications with the California Institute of Technology. The Company is also a siRNA developer.
- **Silence Therapeutics (SLN LN)** – the Company has developed a proprietary short interfering RNA (siRNA molecule). Silence also has developed a proprietary systematic delivery system to deliver molecules to targeted disease tissues and cells. The Company is lead drug partner with Quark & Pfizer and is on Phase I for PKN3-targeted cancer siRNA.
- **Alnylam Pharmaceuticals Inc (ALNY US)** – is an early stage therapeutics company. The Company is developing technology that can specifically and potently silence disease-causing genes. The Company has a number of siRNA drugs and uses Tekmira's LNP delivery patents.
- **Opko Health (OPK US)** – the Company is involved in the discovery, development, and commercialization of pharmaceuticals products, vaccines and diagnostic products. Their siRNA pipeline still focused on AMD.
- **Isis Pharmaceuticals (ISIS US)** – the Company discovers and develops novel human therapeutic compounds and at the moment it has various compounds in clinical trials for a variety of diseases such as Crohn's disease, psoriasis, asthma and cancer. Their research programs support efforts in both antisense and small molecule drug delivery.

Valuation and risks

For the purposes of this analysis we factor into our numbers the proceeds coming from that are currently on preclinical/clinical phase with the majority of the revenues occurring from 2016 onwards. We value the company with a DFC model, we assume a WAAC of 12.7% and LTG of 2.3% which lead to a target price of C\$67.

Discounted Cashflows

Free Cash Flow

	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
Free Cash Flow	-8	-9	33	38	57	97	122	169	217	222
PV of cashflows		-8	26	27	35	54	60	74	84	76
PV of terminal Value										741

Long term growth	2.30%
WACC	13%

Enterprise Value	C\$1,169
Net Debt	0

Estimated Market price C\$1,169

Estimated value per sh.	C\$67
Current Share price	C\$27
upside / downside	150%

Risks that could drive the share price lower are (1) delay on the clinical trials compared to our estimates, **(2)** not satisfactory outcome of clinical trials for the therapies that are currently undergoing this process **(3)** development and commercialization of pipeline products.

Peer Group	Ticker	Share Price(\$)	MktCap (\$bn)	Share Price(\$)
Tekmira @current	TKMR US	\$23.50	\$505.5	\$23.50
Dicerna Pharma	DRNA US	\$32.20	\$564.4	\$32.20
Arrowhead Research Corp	ARWR US	\$16.37	\$728.3	\$16.37
Silence Therapeutics PLC	SLN LN	\$4.40	\$222.5	\$4.40
Avg RNAi (early stage)			\$505.07	
Alnylam Pharma	ALNY US	\$63.97	\$4,088.8	\$63.97
Opko Health	OPK US	\$9.08	\$3,652.0	\$9.08
Isis Pharma	ISIS US	\$42.90	\$4,873.8	\$42.90
Avg RNAi (late stage)			\$4,204.87	
Avg Total			\$2,355	

Ownership – shareholder structure

The main shareholders of the group are listed below:

Major Shareholders				
Name	%	No. Shares	Change	Date
Franklin Resources	9.41%	2,022,400	2,022,400	31/12/2013
Newby Steven	5.61%	1,206,000	262,000	14/02/2014
BMO Financial Corp.	3.49%	749,599	-49,270	31/12/2013
Sabby Management	2.42%	519,200	519,200	31/12/2013
Growthworks Canadian Fund	2.33%	500,550	-413,253	31/12/2012
Baker Bross Advisors LLC	2.33%	479,755	500,000	31/12/2013
Jewell Donald	2.23%	348,000	1,600	07/08/2013
Pointstate Capital	1.62%	245,562	348,000	31/12/2013

Summary of Financial Statements

Our financial assumptions are based on the fact that all products that are on Tekmira's pipeline and are in a process of clinical trials are going to be approved. We use the Company's guidance with regards to royalty rates etc.

Revenue From TKMR Pipeline	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
TKM - PLK1 - Oncology	\$0	\$0	\$0	\$0	\$10	\$40	\$53	\$67	\$87	\$107
TKM-Ebola - Ebola Virus Infection	\$0	\$0	\$31	\$32	\$33	\$33	\$34	\$35	\$36	\$37
TKM-HBV - Hepatitis B (HBV)	\$0	\$0	\$0	\$0	\$0	\$0	\$5	\$39	\$66	\$94
TKM -ALDH2 - Alcohol Use Disorder	\$0	\$0	\$0	\$0	\$3	\$8	\$13	\$18	\$24	\$30
TKMR Revenue (USDmn)	\$0	\$0	\$31	\$32	\$45	\$81	\$105	\$160	\$212	\$267
TKMR Revenue (CDmn)	\$0	\$0	\$35	\$36	\$51	\$91	\$118	\$179	\$238	\$300

Revenue From Partner Programs	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
Marqibo - Adults Relapsed Leuke	\$1.24	\$1.91	\$3.46	\$3.55	\$3.64	\$3.73	\$3.82	\$3.91	\$4.01	\$4.10
ALN - TTR02 - TTR Amyloidosis (Alr	\$0.00	\$0.00	\$0.00	\$0.93	\$3.56	\$4.87	\$7.49	\$10.23	\$13.10	\$16.11
ALN - VSP - Liver Cancer (Alnyam)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.68	\$2.62	\$3.59	\$4.60	\$5.65	\$6.76
ALN - PCS - High Cholesterol (Alnyl	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1.15	\$4.40	\$6.02	\$9.25	\$11.06
TKMR Partner Revenue (USDmn)	\$1.24	\$1.91	\$3.46	\$4.48	\$7.88	\$12.37	\$19.29	\$24.75	\$32.01	\$38.04
TKMR Partner Revenue (CDmn)	\$1.39	\$2.14	\$3.88	\$5.01	\$8.83	\$13.85	\$21.61	\$27.73	\$35.86	\$42.61

Income Statement (C\$m)	2011	2012	2013	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
TKMR Product Pipeline	0	0	0.0	0	0	34.69	35.55	50.84	90.91	118.03	178.72	237.75	299.62
Partner Products	0	0	0.0	1.39	2.14	3.88	5.01	8.83	13.85	21.61	27.73	35.86	42.61
Collaborations and Contracts	16.1	12.1	10.4	10.4	15.4	15.6	16.6	19.0	19.0	19.0	19.0	19.0	19.0
Licensing fees and milestone payment	0.5	2	5.0	5.0	5.0	6.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Total Revenue	16.6	14.1	15.5	16.9	22.6	60.2	64.2	85.7	130.8	165.6	232.4	299.6	368.2
Expenses	-27.1	-27	-27.6	-30.1	-37.3	-32.2	-31.1	-34.7	-39.9	-50.5	-70.9	-91.4	-112.3
o/w R&D	-19.9	-18	-21.5	-23.4	-28.25	-24.07	-22.47	-23.13	-22.23	-28.16	-39.52	-50.93	-62.6
o/w G&A	-6.3	-8.1	-5.5	-6.04	-8.106	-7.22	-7.70	-10.28	-15.69	-19.88	-27.89	-35.95	-44.19
o/w D&A	-1	-0.9	-0.6	-0.67	-0.896	-0.90	-0.96	-1.285	-1.961	-2.485	-3.487	-4.494	-5.523
o/w Loss on purchase & settlement c	0	0	0.0	0	0	0	0	0	0	0	0	0	0
Other income (loss)	0.60	42.6	-1.91	0	0	0	0	0	0	0	0	0	0
Net (loss) income	-9.9	29.7	-14.1	-13.2	-14.7	28.0	33.1	51.0	90.9	115.1	161.5	208.2	255.9
EPS	-0.87	2.164	-0.92	-0.76	-0.84	1.61	1.90	2.92	5.21	6.61	9.27	11.95	14.68
EPS fully dil	-0.87	2.074	-0.92	-0.76	-0.84	1.61	1.90	2.92	5.21	6.61	9.27	11.95	14.68
Adj. Net Income	-9.9	-12.9	-12.2	-13.2	-14.7	28.0	33.1	51.0	90.9	115.1	161.5	208.2	255.9
Adj. EPS	-0.87	-0.94	-0.79	-0.76	-0.84	1.61	1.90	2.92	5.21	6.61	9.27	11.95	14.68
Adj. EPS fully dil	-0.87	-0.9	-0.79	-0.76	-0.84	1.61	1.90	2.92	5.21	6.61	9.27	11.95	14.68
Number of Shares	11.32	13.73	15.3	17.43	17.43	17.43	17.43	17.43	17.43	17.43	17.43	17.43	17.43
Number of Shares (dilluted)	11.32	14.32	15.3	17.43	17.43	17.43	17.43	17.43	17.43	17.43	17.43	17.43	17.43
EBITDA	-8.9	-12	-11.5	-12.6	-13.8	28.9	34.0	52.3	92.8	117.6	165.0	212.7	261.4
Margin %	-54%	-85%	-75%	-75%	-61%	48%	53%	61%	71%	71%	71%	71%	71%

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