3410 Market St.
Philadelphia, PA 19104
www.intervirrx.com

Industry: Pharma

- Target Indication: Hemorrhagic Viruses and Neglected Tropical Diseases
- Future indications: Variety of viral infections:

Management

- Michael S. Saporito, Ph.D.
  President & CEO
- Ronald Harty, Ph.D.
  Scientific Founder & Chief Scientist
- Bruce Freedman, VMD, Ph.D.
  Scientific Founder
- Jay Wrobel, Ph.D.
  Head Medicinal Chemistry

Advisory Team & Board of Directors

- Allen Reitz, Ph.D.
  CEO Fox Chase Chemical Diversity Center
- Glen N. Gaulton, Ph.D.
  Vice Dean and Director of Global Health, University of Pennsylvania Perelman School of Medicine

Intellectual Property

- Composition of matter patents on two broad structural classes with coverage until 2036
- Additional chemistry is identifying new structural classes with composition of matter

Non-Dilutive Funding to Date

- $1M in NIH (STTR) grants
- $1.2 M in funding from Wellcome Trust and Phase 1 Ventures

Executive Summary:

- Intervir is discovering first in class host-oriented antiviral inhibitors.
- The unique mechanism of action is widespread among viral types and Intervir compounds will have broad-antiviral applicability.
- The drug target is a host protein critical for viral egress and spread, and inhibitors could therefore provide durable activity and circumvent the occurrence of drug resistant viral mutations.
- The initial therapeutic target for Intervir compounds are Ebola, Marburg, and Lassa viruses (and potentially SARS-CoV-2).
- Intervir has identified lead structural classes with low nanomolar potency and with composition of matter patent protection extending to 2036.
- Intervir has identified a lead candidate that potently blocks egress and spread of live authentic Marburg virus in human primary macrophages (*in vitro*), and in a mouse challenge model (*in vivo*).

Market Opportunity/Unmet Need:

- There are currently no approved therapies for Ebola, Marburg, and Lassa viruses.
- These viruses are categorized as Category A bio-warfare agents. The initial market for these therapeutics will be the US government (DoD, CDC) and global aid organizations for stockpiling and protecting against bioterrorism threats and outbreaks.
- Therapeutics for these neglected tropical diseases are Priority Review Voucher eligible.
- Next generation antiviral targets will include those with large commercial markets.
- There is continued demand for antiviral therapies for these virus types due to the emergence of drug resistance in these highly mutable viruses.
- Intervir compounds will be orally bioavailable small molecules suitable for inclusion in combination antiviral therapies.

Intervir Science:

- Intervir therapeutic products inhibit virus-host interactions that prevent virus budding from the host cell and thus virus transmission.
- The target is the interface between a viral matrix protein L-domain(s) and mammalian host protein Nedd4 (a ubiquitin ligase). The virus utilizes host Nedd4 to facilitate budding from the host cell. Disruption of this interaction reduces virus release and dissemination.
- The L-domain is highly conserved among a wide-array of RNA viruses, suggesting an essential requirement for virus budding and potential for avoiding drug resistance.
- Intervir has discovered two structural classes with low nanomolar potency that inhibit the L-domain-Nedd4 interaction and inhibit live virus budding and dissemination *in vitro* and *in vivo*.
- Intervir compounds are small molecules with oral bioavailability and utility as prophylactic and post viral exposure treatment.
- For the hemorrhagic viruses, treatment duration will be during the “at-risk” phase and for up to one month in infected individuals. For these indications we will develop both an IV and oral version.
- For chronic infections Intervir compounds will be administered continuously (oral) for the life of the patient.
- Intervir compounds will be suitable as monotherapies and for inclusion in combination therapies with antivirals having different mechanisms of action.

Technical Milestones Achieved:

- In silico screen of docking of 4.8M compound with docking to the viral L-domain
- *In vitro* screen of in silico hits identified “active compounds” that inhibit the viral L-domain-Nedd4 interaction
- Medicinal chemistry efforts generated two potent structural classes that inhibit L-domain-Nedd4 interactions and block live virus propagation *in vitro* and *in vivo* with low nanomolar potency and near 100% efficacy.
- Compounds are metabolically stable, and not cytotoxic.
- Establishment of chemical Structure-Activity Relationships (SAR) that provide a path forward for additional inhibitors.