# RESEARCH AGENDA: PERSPECTIVE FROM ACADEMIA

(Hypothesis Driven)

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# Background



- JC virus is a very difficult agent to work with
- Research will continue but move slowly compared with more conventional agents
- New research approaches may be needed such as coordinated technologies and ‘team’ investigations, that direct ‘translational’ work.

# Recommended Research Areas

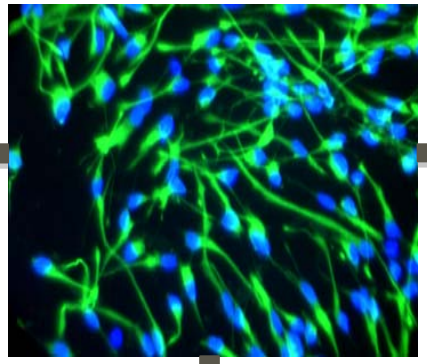


- Research approaches
  - Molecular genomics/proteomics; virus and host
  - Viral gene regulation in specific cells i.e. glia vs neuron
  - Immunology of therapies and host response to infection
- Drug Discovery
  - Small molecules for intervention of viral growth once identified; ***relevant cell model for screen***
  - Vaccines, peptides, VLPs (like papilloma virus)
    - Prophylactic
    - Therapeutic
- Pre-clinical studies/clinical studies
  - ***Relevant*** animal model for pathogenesis and intervention

# Human CNS Multipotential Progenitor Cells



Nestin

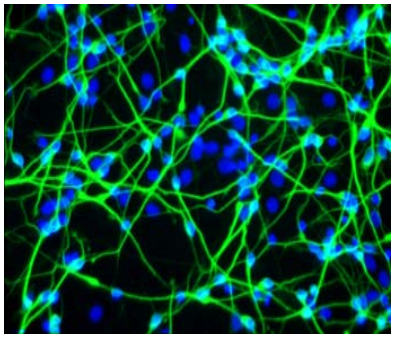


BDNF (10 ng/ml)
+PDGF (10 ng/ml)

10% Serum

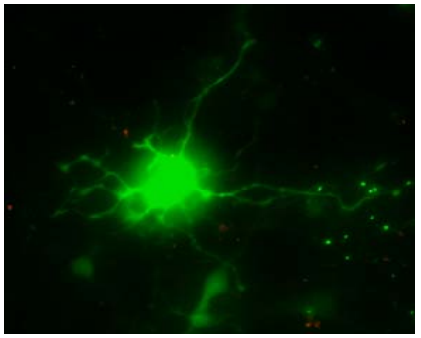
bFGF (25 ng/ml) • EGF (20 ng/ml)
T3, bFGF, PDGF + growth factor withdrawal

B-III Tubulin



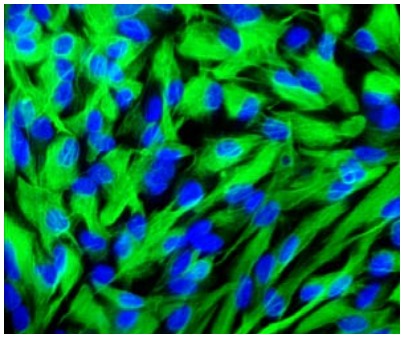
Differentiated Neuronal Cells

O4/GFP



Differentiated Oligodendrocytes

GFAP



Differentiated Glial Cells

# Recommended Research Areas



- Research approaches
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  - Viral gene regulation in specific cells i.e. glia vs neuron
  - Immunology of therapies and host response to infection
- Drug Discovery
  - Small molecules for intervention of viral growth once identified; ***relevant cell model for screen***
  - Vaccines, peptides, VLPs (like papilloma virus)
    - Prophylactic
    - Therapeutic
- Pre-clinical studies/clinical studies
  - ***Relevant*** animal model for pathogenesis and intervention

# Non-Human Primate Model



# Recommended Research Areas



- Research approaches
  - Molecular genomics/proteomics; virus and host
  - Viral gene regulation in specific cells i.e. glia vs neuron
  - Immunology of therapies and host response to infection
- Drug Discovery
  - Small molecules for intervention of viral growth once identified; ***relevant cell model for screen***
  - Vaccines, peptides, VLPs (like papilloma virus)
    - Prophylactic
    - Therapeutic
- Pre-clinical studies/clinical studies
  - ***Relevant*** animal model for pathogenesis and intervention

# NIH-Funded JCV/PML Research Areas

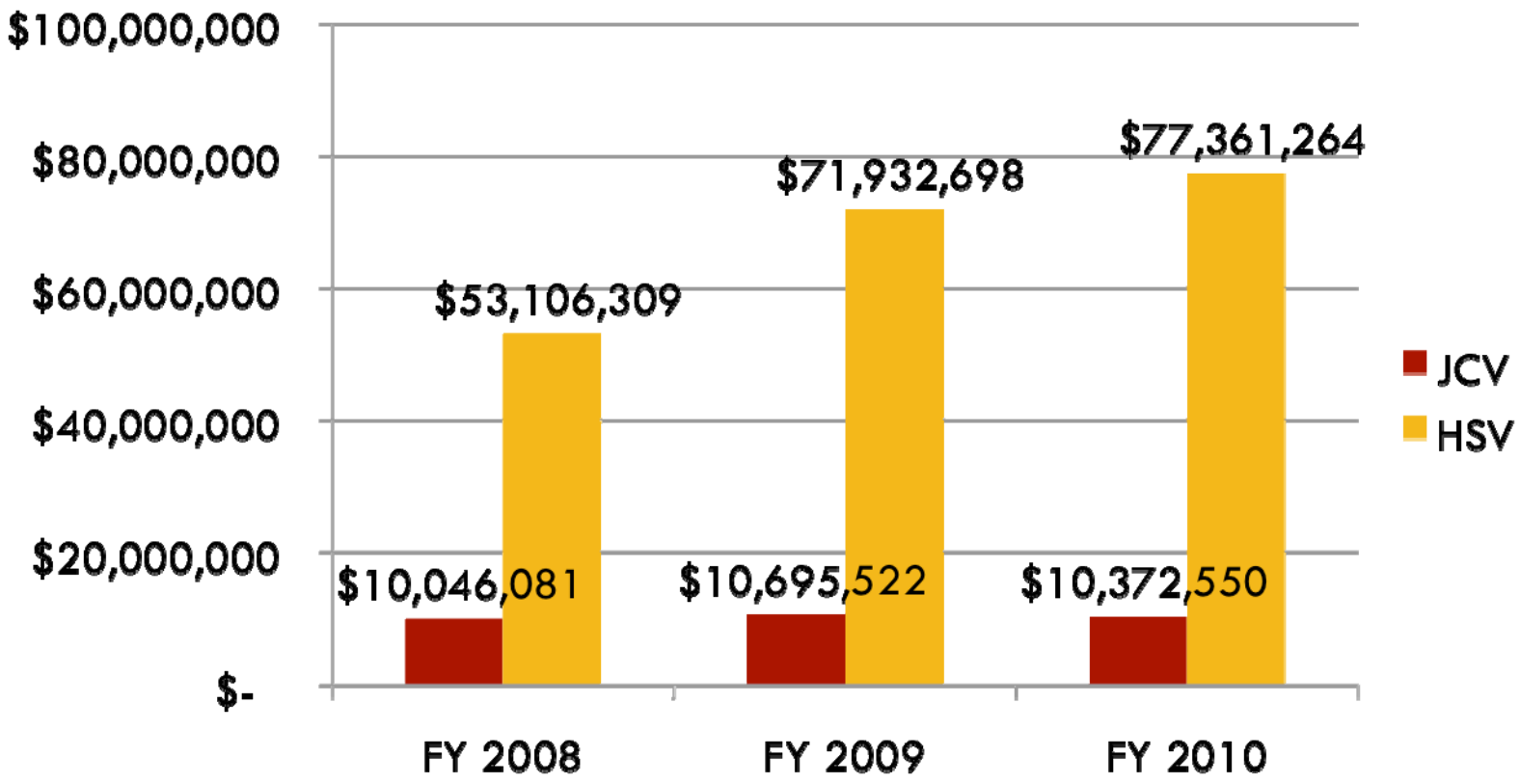


| Number of Projects Funded Per Major Research Area | | | |
|---|---|---|---|
| | **FY 2008** | **FY2009** | **FY2010** |
| Epidemiology/Pathogenesis | 2 | 2 | 2 |
| Disease/Molecular Mechanisms | 8 | 10 | 8 |
| Therapeutic/Vaccine Development | 0 | 2 | 4 |
| Cellular Response/Structure | 2 | 2 | 2 |
| Clinical Presentation/Diagnostics | 3 | 3 | 3 |
| Immunology/Virology | 9 | 7 | 5 |

Data retrieved from the public accessible NIH Report: http://report.nih.gov/

# Comparison of NIH-Funding for JCV & HSV






Data retrieved from the public accessible NIH Report: http://report.nih.gov/

# Summary



To advance research, the field needs more formal support and collaboration and ***needs infusion of new ideas***. Additionally, ***recruiting new principal investigators from different fields*** such as rheumatology, immunology, basic neuroscientist (glial) cells, genetics and neuro-infectious diseases will help to advance the science that should inform medical research.