EXECUTIVE SUMMARY

Participants and organizers met for a day and a half (Jan. 17-18, 2008) to discuss the future of the Vector Biology field. The meeting took place at the UC Davis campus, immediately following the US/Japan Parasitology Panel annual meeting (Jan. 16-17, 2008).

The 23 participants, all leaders of their respective areas of expertise, represented a broad breath of vector biology areas of study as well as a variety of vectors. An effort was made to invite participants from domestic as well as foreign institutions, especially from disease endemic countries.

This meeting represented a first step to initiate a dialogue among the members of the vector biology community with respect to identifying the current needs, challenges, gaps and opportunities in the vector biology field now and in the future. The expectation of the group was to make available to the broader vector community a summary of the discussions to enable others to have an input as well in terms of the future of this area of science.

The overall goal of this meeting was to initiate the development of a cross-cutting research agenda for elucidating the role of arthropod vectors in pathogen transmission and, as part of an integrated approach, to use this information to inform disease management strategies.

There were three anticipated outcomes: (1) the development of specific recommendations; (2) the focus on research and resource development in areas with greatest impact on disease prevention and defined in terms of short, medium, and long-term goals; and (3) the enhancement of interactions among investigators within and among different areas of vector biology. As part of the discussions, participants were also asked to consider both basic and translational research as well as tools and resources needed. Issues regarding training, recruitment and retention of investigators in the field of vector biology were also considered.

The meeting was divided into 6 broad topic areas: (1) Vector Biology Perspectives; (2) Specific Vectors; (3) Vector/Pathogen Interactions; (4) Control-Related Topics; (5) Vectors and the Environment; and (6) Quantitative Analysis and Modeling. Invited speakers presented under each of the six categories, followed by a discussion period. At the end of the day and a half, a group discussion took place and representatives of each topic area provided a list of priorities for their respective area.

Summary of each topic area discussion:

Vector Biology Perspectives (Barry Beaty, Jim Kazura)
Multi/inter-disciplinary approaches to vector control are needed. Effective and sustainable approaches will involve straight-forward decision making tools for government and public health officials. Control strategies tailored to specific settings/geographic areas are desirable.

Specific Vectors (Greg Lanzaro, Celia Cordon-Rosales, Moses Bockarie, Bob Lane)
The discussion revolved around sand flies (vectors of leishmaniasis), triatomine bugs (vectors of Chagas Disease), mosquitoes (vectors of Filariasis), and ticks (vectors of several diseases). Cross-cutting issues for all these vectors included lack of studies on biology/ecology in the field, surveillance to evaluate success of control campaigns, and better diagnostic methods for detection of infection in the vectors.

Vector/Pathogen Interactions (Shirley Luckhart, Ken Vernick, Aaron Brault, Anthony James, Ikuo Takashima)
Caution should be used when interpreting results of experiments based on model systems versus real or field-based systems, as the extrapolation may yield an inaccurate conclusion. Capacity building in disease-endemic countries is essential to establish field-based research and building in-country capacity for deployment of interventions.

Control-Related Topics (Bruce Hammock, Walter Leal, Bart Knols, Willem Takken)
A high level of diversity in the vector control tool box is desirable, as this may result in a higher probability of success. Susceptibility to insecticides is a precious resource that should not be squandered. Public interest and support are essential for a successful vector control effort.

Vectors and the Environment (Bill Reisen, Anton Cornel, Thomas Scott, Steve Lindsay)
Integrated vector management is the only realistic approach to the successful control of vector-borne diseases. In order to assess the success of an intervention, baseline data is essential.

Quantitative Analysis and Modeling (Uriel Kitron, Cynthia Lord, David Smith)
There is a need for a higher level of interaction between modelers and data collectors, to ensure sufficient, high quality data is integrated into the models. More sensitive surveillance methods are necessary, especially for diseases with a low level of endemicity. Model development and validation remain “neglected” areas in vector biology, with a great need for better training programs.

Conclusions and Recommendations

Even though great progress has been made in establishing molecular tools for the study of vectors, integration of these tools with field related needs is essential in the development of integrated vector management programs.
Disease transmission can only be affected by using a multi-pronged approach that includes vector control and other interventions (drugs, vaccines, etc.). Local vector management approaches that affect more than one disease are desirable. Surveillance tools must be improved in order to better assess if control strategies are working. Training of new investigators in the many areas of vector biology is needed.