Title: METHODS FOR IDENTIFYING COMPOUNDS THAT INHIBIT HIV INFECTION

Abstract: This invention provides novel methods for identifying agents that inhibit HIV infection. The anti-HIV agents are identified by screening test compounds for ability to down-regulate the kinase activity or the expression of a PAK3 molecule. Such PAK3 modulators can be further examined for their activity in inhibiting HIV infection. These novel anti-HIV agents are useful in the prevention or treatment of HIV infection and conditions associated with HIV infection.
A. CLASSIFICATION OF SUBJECT MATTER
IPC: C12Q 1/70(2006.01); C12N 7/00(2006.01); 7/01(2006.01)
USPC: 435/5, 235.1
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S.: 435/5, 235.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 6,383,734 B1 (MARSHALL et al.) 7 May 2002 (07.05.2002), col.9, line 60 to col. 10, line 32.</td>
<td>1 and 3-5</td>
</tr>
<tr>
<td>Y</td>
<td>US 2004/0102623 A1 (MONIA et al.) 27 May 2004 (27.05.2004), entire document.</td>
<td>1 and 3-5</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search

Date of mailing of the international search report
19 FEB 2007

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1420
Alexandria, Virginia 22313-1420
Facsimile No. (571) 273-3201

Authorized officer
Nicole E. Kinsey, Ph.D.
Telephone No. (571) 272-1600

Form PCT/ISA/210 (second sheet) (April 2005)
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RENKEMA et al., Human immunodeficiency virus type I nef selectively associates with a catalytically active subpopulation of p21-activated kinase 2 (PAK2) independently of PAK2 binding to Nck or B-PIX, J. Virol., March 2001, Vol. 75, No. 5, pages 2154-2160.</td>
<td>1-11</td>
</tr>
</tbody>
</table>
INTERNATIONAL SEARCH REPORT

International application No.
PCT/US06/04264

Box No. II  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. □ Claims Nos.:
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. □ Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-11

Remark on Protest
□ The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.
□ The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.
□ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet(2)) (April 2005)
BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-11, drawn to a method for identifying an agent that inhibits HIV infection, comprising assaying a biological activity of a p21-activated kinase 3 (PAK3) molecule or a fragment thereof, in the presence of test compounds to identify a compound that inhibits the biological activity of the PAK3 molecule.

Group II, claims 12-20, drawn to method for identifying an agent that inhibits HIV infection, comprising (a) screening test compounds to identify PAK3-modulating compounds that down-regulate the kinase activity or cellular level of a PAK3 molecule, and (b) testing the identified PAK3-modulating compounds for ability to inhibit HIV infection.

Group III, claims 21-25, drawn to a method for treating HIV infection in a subject, the method comprising administering to the subject a pharmaceutical composition comprising an effective amount of a PAK3-modulating compound which down-regulates the kinase activity or the expression of a p21-activated kinase 3 (PAK3).

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Each group has a different technical feature that is not shared with any other group. Groups I and II, which are methods for identifying an agent that inhibits HIV infection, have different steps for carrying out the method. Group III is a method for treating HIV which is completely different from methods for identifying an agent. Thus, unity of invention is lacking.

Continuation of B. FIELDS SEARCHED Item 3:
Dialog (MEDLINE, EMBASE, SCISEARCH, BIOSIS)
Search terms: PAK, PAK1, PAK2, PAK3, P21 ACTIVATED KINASE, HIV, HUMAN IMMUNODEFICIENCY VIRUS, VIRUS,