ASSERTION OF A DIDACTIC ILLUSTRATION SCHEME OF THE IMMUNOLOGICAL RELATIONSHIP BETWEEN THE INDUCTION OF THE CCL5/CCR5 AXIS BY HIV-1 INFECTION AND NEUROAIDS

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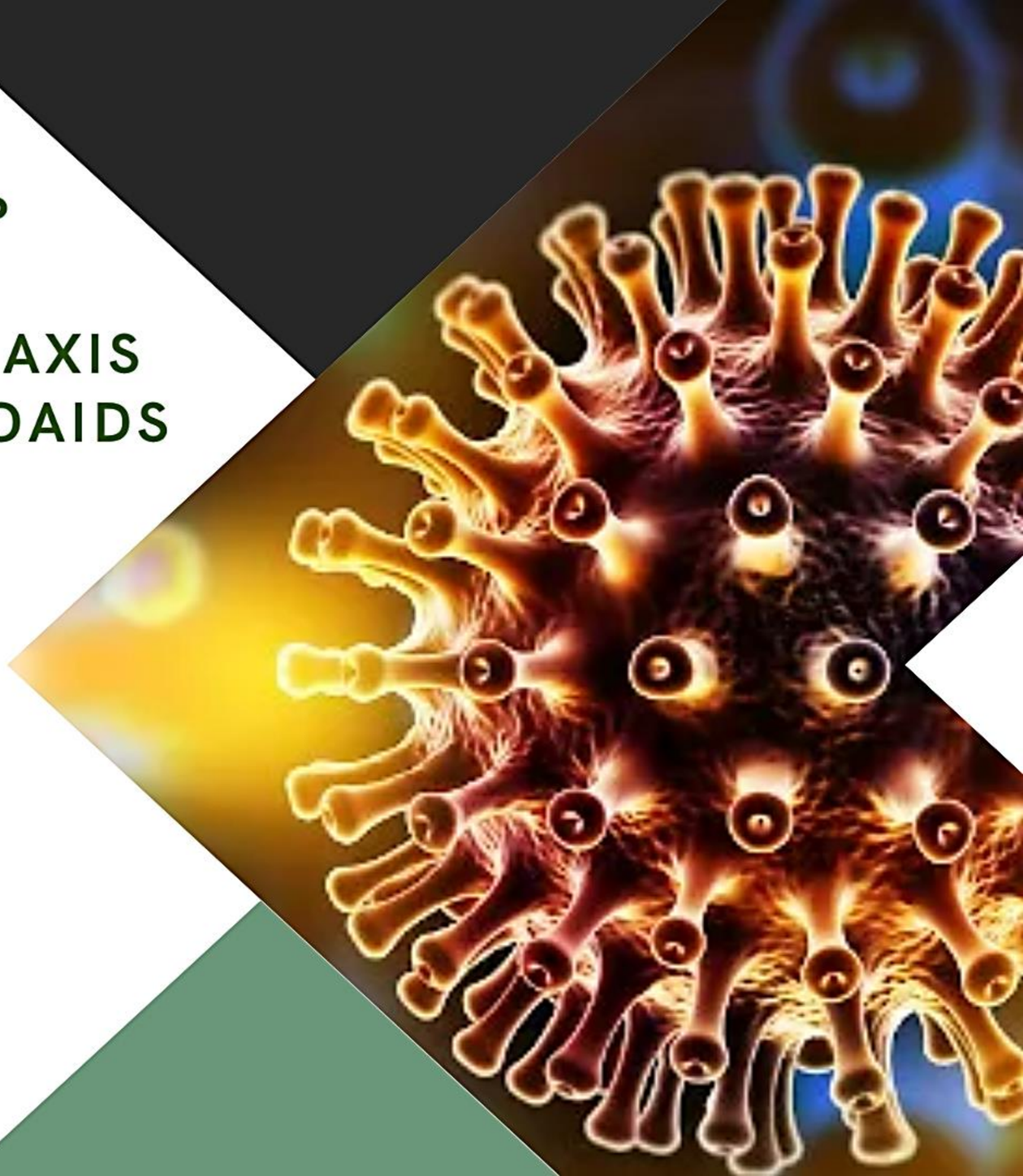


INTRODUCTION

- **Neurological Illness** in an HIV-positive individual can be result:

  host immune response.

- HIV interacts with CCR5 or CXCR4, viral co-receptors, after employing CD4+ T cells as the main receptor.

- CCR5 orientates chemokines from the C-C class, such as CCL5/RANTES

INTRODUCTION

neuroAIDS

CO-RECEPTOR (CCR5) SIGNALING PATHWAYS

NEUROINFLAMMATION AND INDIRECT NEUROTOXICITY

OBJECTIVE

- REVIEW AND BUILD A DIDACTIC MODEL ABOUT THE IMMUNOPATHOLOGICAL RELATIONSHIP BETWEEN THE CCL5/CCR5 AXIS AND NEUROAIDS PROGRESSION.

METHODOLOGY

SYSTEMATIC REVIEW

- PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2020 recommendations;
- Articles were selected from the electronic databases PUBMED, MEDLINE, LILACS and SCIELO;
- Descriptors together with 'AND': “HIV-1", “Neurological Manifestations", “CCR5“, “CCL5” and “Immunity".
- English, Portuguese or Spanish languages.

METHODOLOGY

DATA COLLECTION AND EXTRACTION

THE DATA EXTRACTED FROM THE ARTICLES WERE: Author and year of publication, database, methodology, and results.

- Inclusion criteria: articles published from January 1990 to June 2023.
- Exclusion criteria: articles with only the abstract available and with topics not pertinent to the theme.

METHODOLOGY

METHODOLOGICAL QUALITY ASSESSMENT

- Joanna Briggs Institute (JBI) critical appraisal checklists.

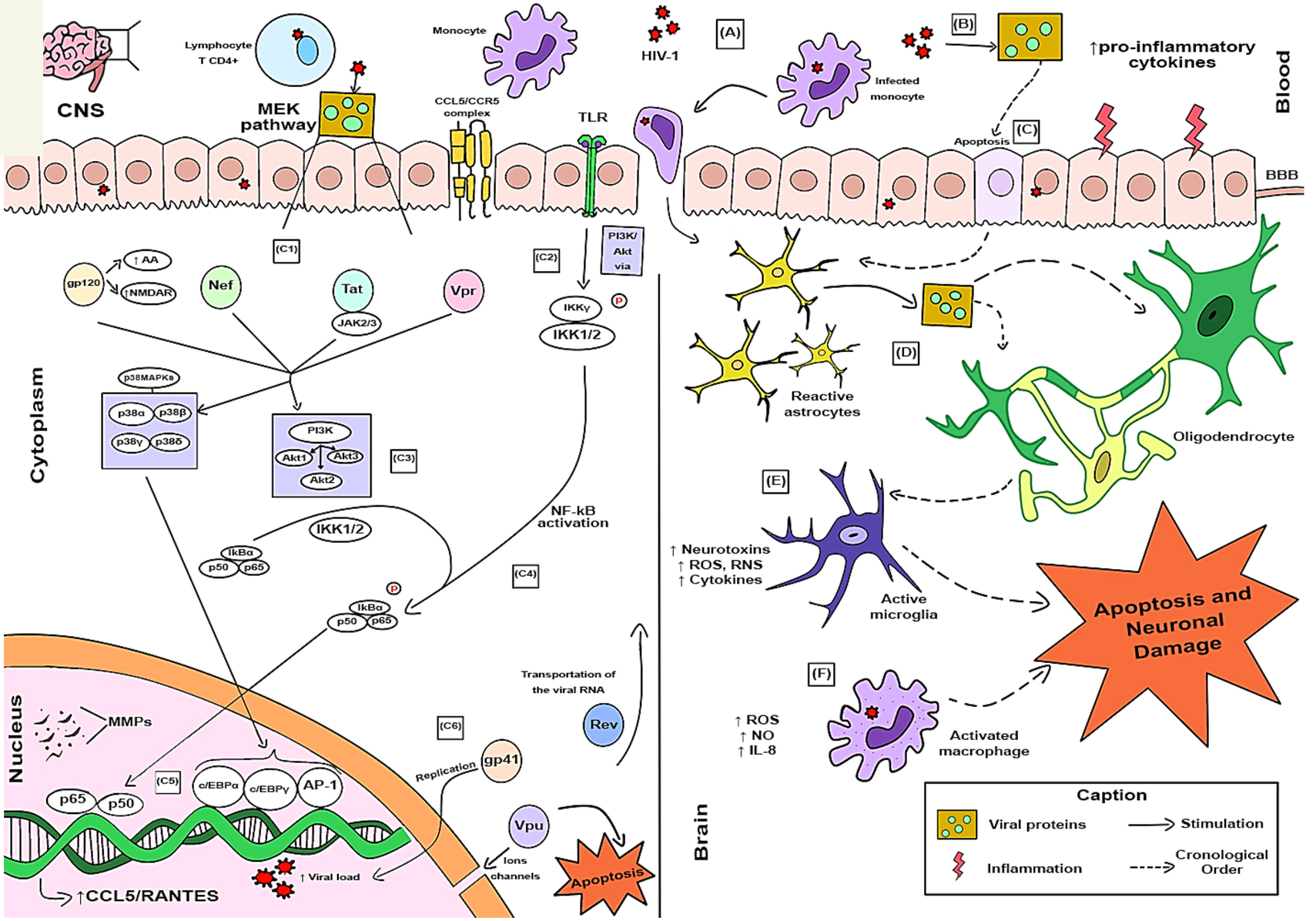
ILLUSTRATIVE SCHEME CONSTRUCTION

- Adobe Photoshop CS6.

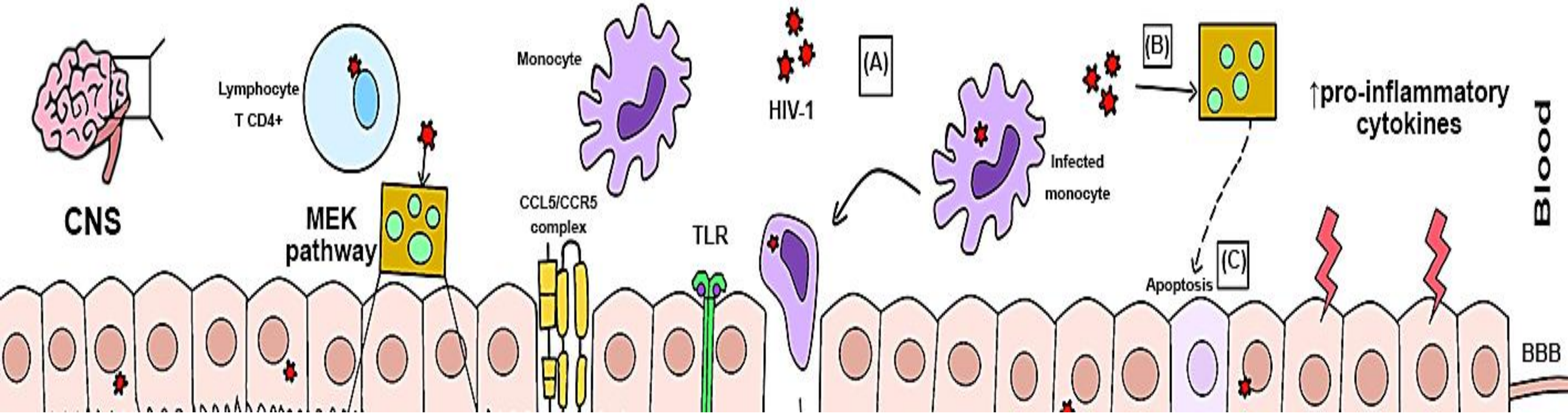
RESULTS

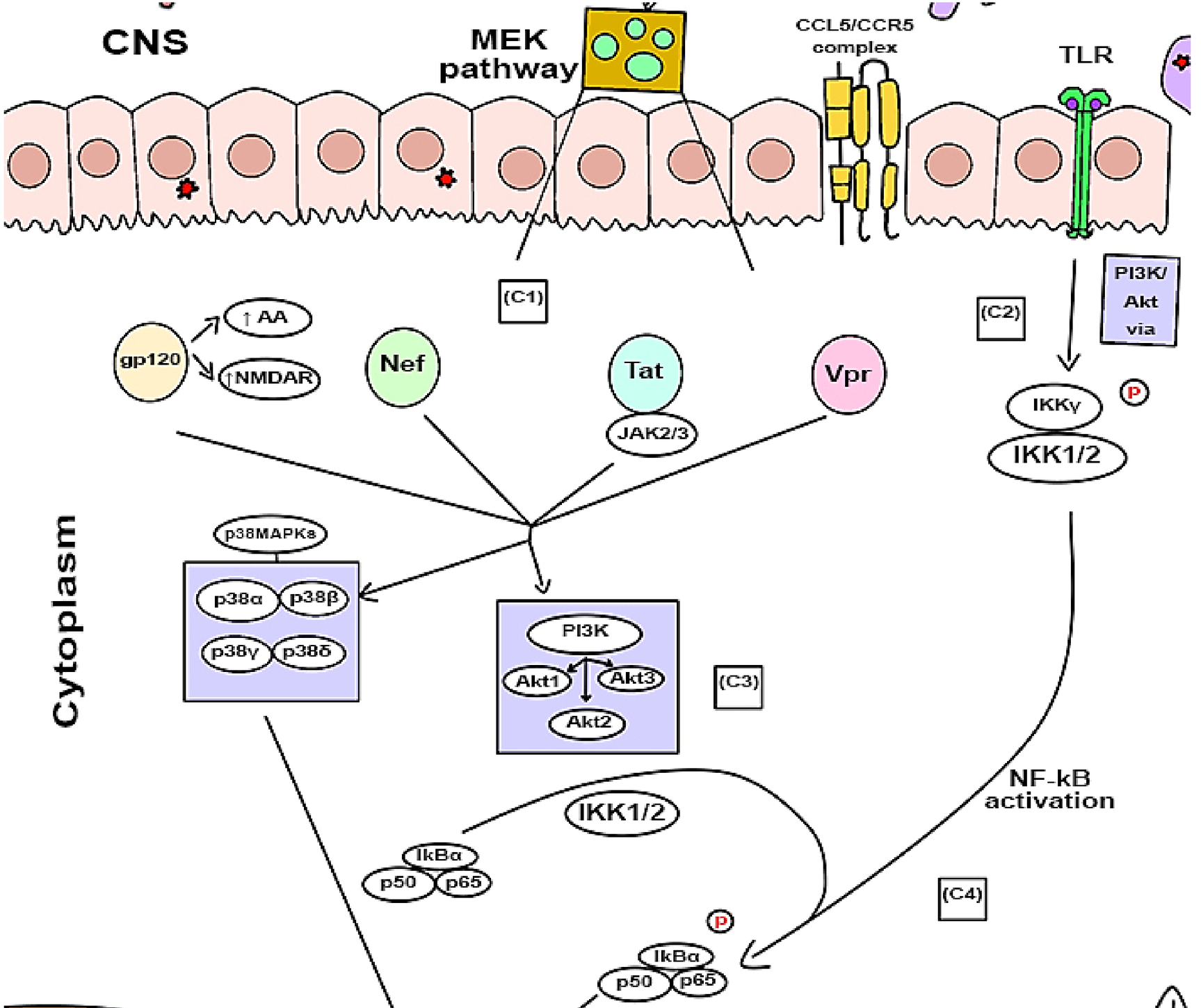
THE SEARCH RESULTED IN 36 ARTICLES.

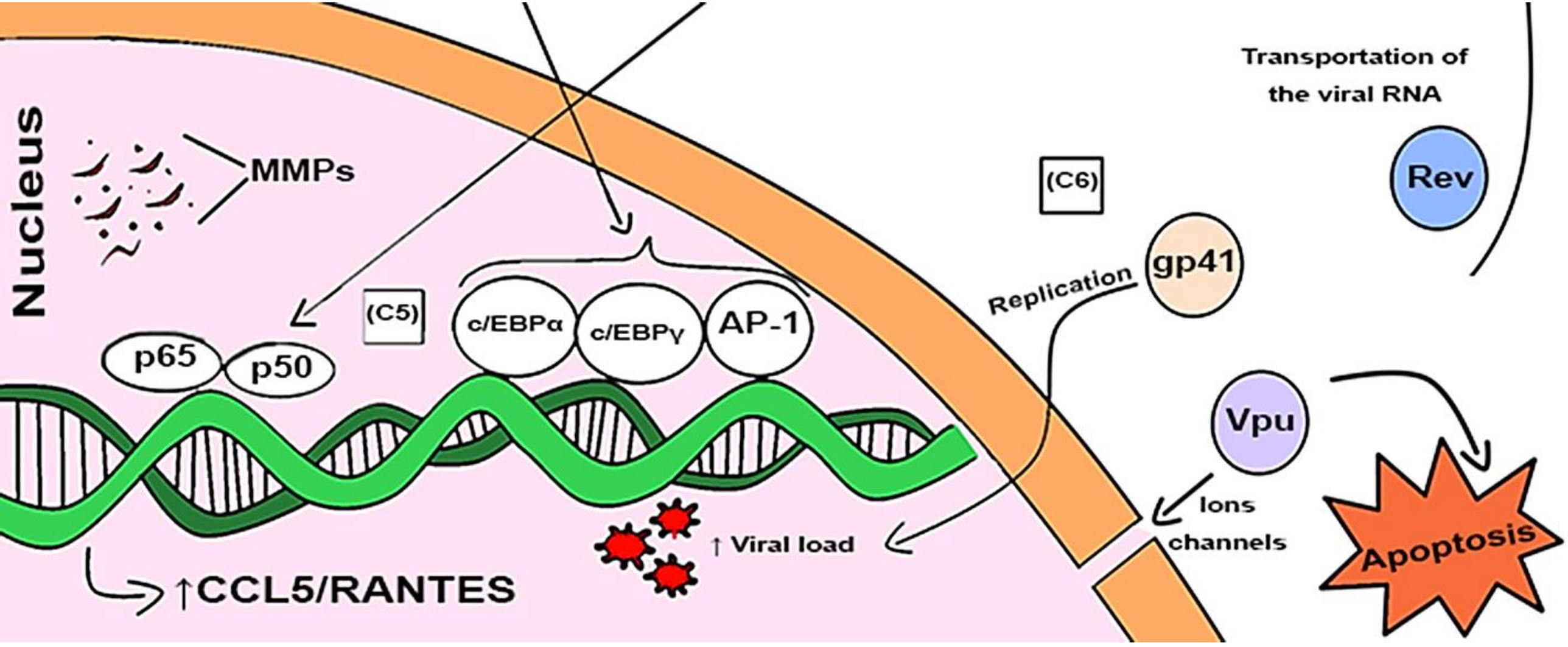
FIGURE 1 - ILLUSTRATIVE SCHEME OF CCL5/CCR5 AXIS INDUCTION BY HIV-1 INFECTION AND ITS EFFECTS ON CENTRAL NERVOUS SYSTEM (CNS).

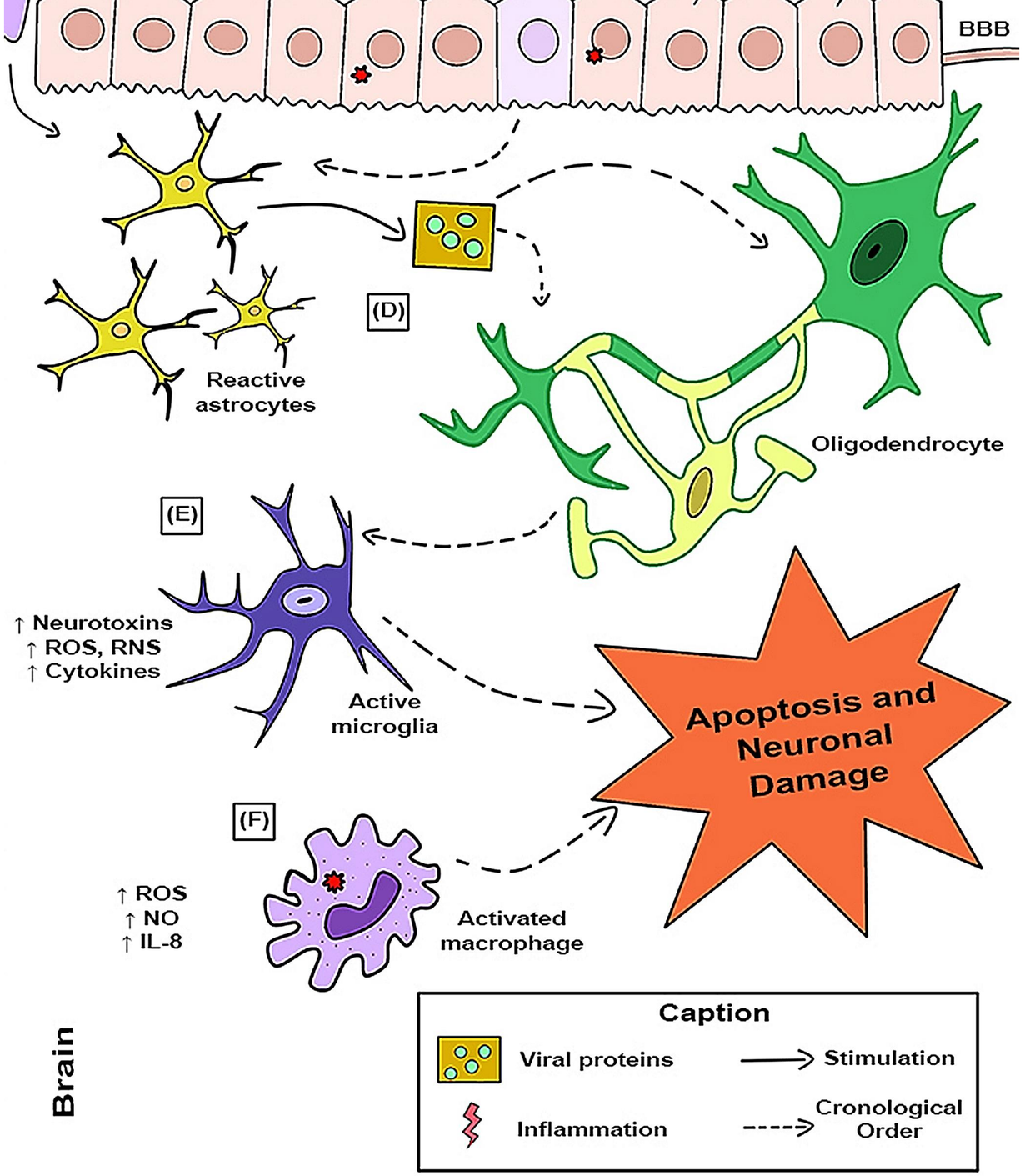


Source: Authors (2023).


CNS
Lymphocyte
T CD4+
MEK
pathway
Monocyte
CCL5/CCR5
complex
TLR
HIV-1
(A)
Infected
monocyte
(B)
↑pro-inflammatory
cytokines
Apoptosis
(C)
Blood
BBB


CNS
MEK pathway
CCL5/CCR5 complex
TLR
(C1)
(C2)
PI3K/ Akt via
gp120
↑ AA
↑NMDAR
Nef
Tat
JAK2/3
Vpr
IKKγ
IKK1/2
P
Cytoplasm
p38MAPKs
p38α
p38β
p38γ
p38δ
PI3K
Akt1
Akt3
Akt2
(C3)
NF-kB activation
IKK1/2
IkBα
p50
p65
(C4)
P
IkBα
p50
p65


Nucleus
MMPs
p65
p50
(C5)
c/EBPα
c/EBPγ
AP-1
↑CCL5/RANTES
↑ Viral load
Transportation of
the viral RNA
Rev
(C6)
gp41
Replication
Vpu
Ions
channels
Apoptosis


BBB
(D)
Reactive
astrocytes
Oligodendrocyte
(E)
↑ Neurotoxins
↑ ROS, RNS
↑ Cytokines
Active
microglia
Apoptosis and
Neuronal
Damage
(F)
↑ ROS
↑ NO
↑ IL-8
Activated
macrophage
Brain
Caption
Viral proteins
Stimulation
Inflammation
Cronological
Order

CONCLUSION

- HIV IS NEUROVIRULENT, NEUROTROPHIC, AND NEUROINVASIVE.
- CCR5 IS THE PRIMARY RECEPTOR FOR HIV-1 ENTRY IN CELLS WHEN COMBINED WITH THE VIRAL GLYCOPROTEIN 120 (gp120).
- CO-RECEPTOR SIGNALING MAY ALSO CONTRIBUTE TO ONGOING NEUROINFLAMMATION AND INDIRECT NEUROTOXICITY.
- WHEN HIGH CONCENTRATIONS OF CCL5/RANTES ARE PRESENT IN THE BODY OF HIV-1 INFECTED ONES, THERE IS PRODUCTION OF MORE INTENSE INFLAMMATORY RESPONSES, CULMINATING, FOR EXAMPLE, IN DEMENTIA IN THESE PATIENTS.
- THE CCR5-CCL5 IMMUNE AXIS CONTRIBUTE TO THE NEUROAIDS PROGRESSION.

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