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“Science125个科学前沿问题”系列解读(Ⅰ)
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How are memories stored and retrieved?

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(encoding) (consoled-
ation) (retrieval) [1]. [3,8,9],
[10,11], ,
, [2]. [12].
[3,4], ,
[5], ,
. .
(forgetting) .

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, ,
(consolidation) [6]. .
[13].
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[7]. , [14]. ,
(reconsolidation), , ,
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[15]. ,
[13].
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(bilateral temporal lobe) ,
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[16]. ,
, ,
, . ,
(recent
memory) (remote memory),
, [17],
, .
,
(functional magnetic resonance imaging, fMRI)
, (hippocampus)
( ) [18],
[19~21],
[22]
[23,24], [25,26]. Whitlock
[27] ,
, CA1
.
, (medial tem-
poral lobe, MTL) .
, , ,
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,
(anterior cingulate cor-
tex, ACC) [17,28]. ,
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, [21,29,30]. ,
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. O’Keefe
Dostrovsky[31] , CA1
(*Rattus norvegicus*)
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, Moser [32]
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O’Keefe Moser
2014 ,
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fMRI
[33,34]. , ,
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, [35]. ,
“ ” “ ” “ ” .
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[18,35]. ,
(parahippocampal cortex)
[18], ,
.
[36] fMRI[37] .
. ,
, (amygdala)
[38~40]. ,
, ,
[41],
“ ” [42].
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. ,
, (neocortex) -
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2

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, [43].

[16]. ,

Kroes [55] [59]

[54,56] [57]

[60]

[10] [61]

[62]

[10] [63]

(*Mus musculus*) [11]

[63,64]

? 19

, Freud Strachey[65]

[8,9,11]

[66]. Anderson [67]

“ - ” “ - ” “ - ”

3

[1] “ ”

[6]

[55] [17]

[58]

fMRI

(extinction)

(interference) (inhibition).

, Anderson Green[68] 2001

[69~71]

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. , Wang [72] ,
A-C B-C , A-C , .
, A B C, .
. , , Freud ,
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[73]. , .
Freud , . . ,
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, [12,74].
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. Kibra[4], SCN1A[27] CTNNBL1[75] . ,
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The dynamic memory system: The encoding, consolidation and forgetting process of memory

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The study on human memory in modern psychology has lasted for more than a century. Memory is a dynamic process. New memories are encoded and stored mainly in the hippocampus. Consolidation stabilizes newly formed memory and enables the memory to be preserved. However, recent evidence has shown that consolidation is not a one-way process. With the retrieval or reactivation of memory, the consolidated memory returns to an unstable state, thus requiring a reconsolidation process to preserve. The reconsolidation process of memory in human opens a new window to interfere or update old memories. The current review covered recent findings on the whole process of memory, from the encoding, through the consolidation and reconsolidation, and to the forgetting of the memory. We discussed the current progress and the challenges on memory study, and suggested possible directions for future research.

memory, storage, consolidation, reconsolidation, forgetting

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