Supplementary table 1: Chronology of pathologies in various mouse models of Alzheimer’s disease

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| --- | --- | --- | --- | --- |
| **Mouse line** | **Genetics** | **General pathologies (months)** | **Sleep impairment (months)** | **References** |
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| **APP-BASED MOUSE MODELS OF AD** | | | | |
|  | | | | |
| APP23 | * APP mutation: Swedish | * Memory deficits: (3 m) * Plaques: (6 m) * Gliosis: (6 m) * Hyperphosphorylated tau: (6 m) * Neuronal loss (14-18 m) * No synaptic loss * No change in long-term potentiation * No tangles | * Altered power spectra (6 m) * Altered NREM duration (12 m) * Altered REM duration (12 m) | (Boncristiano et al., 2005; Calhoun et al., 1998; Roder et al., 2003; Stalder et al., 1999; Sturchler-Pierrat et al., 1997; Van Dam et al., 2003; Van Erum et al., 2019) |
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| AppNL-G-F/NL-G-F | * APP mutation: Swedish, Iberian, Arctic | * Plaques: (2-5 m) * Gliosis (2-7 m) * Memory deficits: (6 m) * No tau hyperphosphorylation * No tangles * No neurodegeneration | * Altered power spectra (6 m) * Altered NREM count (6 m) * Altered REM duration (6 m) * Altered NREM duration (12 m) * Altered REM length (12 m) | (Castillo et al., 2017; Maezono et al., 2020; Nilsson et al., 2014; Saito et al., 2014) |
|  | | | | |
| J20 | * APP mutation: Swedish, Indiana | * Puncta A (1 m) * Synaptic loss: (3 m) * Neuronal differentiation: (3 m) * Neuronal loss (3 m) * Gliosis (3 m) * Memory deficits: (3-4 m) * Plaques (7 m) * No neuronal loss * No tangles | * Altered power spectra (11-12 m) * Partially altered REM duration (11-12 m) | (Cheng et al., 2007; Filon et al., 2020; Hong et al., 2016; López-Toledano and Shelanski, 2007; Wright et al., 2013) |
|  | | | | |
| PDAPP | * APP mutation: Indiana | * Memory deficits: (3 m) * Reduced long-term potentiation (4-5 m) * Plaques (6-9 m) * Gliosis (6-9 m) * Dendritic loss (2 m) * Synaptic loss (8 m) | * Partially altered REM duration (3-5 m) * Partially altered NREM duration (20-26 m) * Altered REM length (20-26 m) * Altered NREM length (20-26 m) * Altered REM count (20-26 m) | (Dodart et al., 1999; Games et al., 1995; Huitrón-Reséndiz et al., 2002; Lanz et al., 2003; Larson et al., 1999) |
|  | | | | |
| Tg2576 | * APP mutation: Swedish | * Synaptic loss (2-4.5 m) * Reduced long-term potentiation (6 m) * Memory deficits (6 m) * Plaques: (9-18 m) * Gliosis (10-16 m) | * Interictal spikes (1.5 m) * Altered REM duration (6 m) * Altered REM length (6 m) * Altered power spectra (8-12 m) | (Frautschy et al., 1998; Hsiao et al., 1996; Irizarry et al., 1997; Jacobsen et al., 2006; Kam et al., 2016; Kent et al., 2018; Lanz et al., 2003; Wisor et al., 2005; Zhang et al., 2005) |
|  | | | | |
| TgCRND8 | * APP mutation: Swedish, Indiana | * Plaques (2-3 m) * Memory deficits (3 m) * Gliosis (3-3.5 m) * Reduced long-term potentiation (6 m) * Synaptic loss (6 m) * Neuronal loss (6 m) * Hyperphosphorylated tau (7 m) | * Altered power spectra (3 m) * Altered NREM duration (3 m) * Altered REM duration (3 m) | (Adalbert et al., 2009; Bellucci et al., 2007; Brautigam et al., 2012; Chishti et al., 2001; Colby-Milley et al., 2015; Dudal et al., 2004; Kimura et al., 2012) |
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| **APP AND PSEN DOUBLE TRANSGENIC MOUSE MODELS OF AD** | | | | |
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| 5XFAD | * APP mutations: Swedish, London, Florida * PSEN1 mutation: PSEN1, L286V | * Plaques (1.5 m) * Gliosis (2 m) * Memory deficits (4-5 m) * Synaptic loss (4 m) * Reduced long-term potentiation (6 m) * Neuronal loss (9 m) (ALZFORUM claims earlier) | * Altered total sleep duration (4-4.5 m) * Altered total sleep length (4-4.5 m) * Altered power spectra (6 m) | (Buskila et al., 2013; Duncan et al., 2019; Eimer and Vassar, 2013; Kimura and Ohno, 2009; Oakley et al., 2006; Schneider et al., 2014; Sethi et al., 2015) |
|  | | | | |
| APPswe/PS1∆E9 | * APP mutation: Swedish * PSEN1: E9 | * Long-term potentiation (3 m) * Synaptic loss (4 m) * Plaques (6 m) * Gliosis (6 m) * Memory deficits (6-12 m) | * Altered power spectra (3 m) * Altered NREM duration (3 m) * Altered REM duration (9 m) | (Hong et al., 2016; Jankowsky et al., 2004; Kamphuis et al., 2012; Malm et al., 2011; Roh et al., 2012; Volianskis et al., 2010; Zhang et al., 2019) |
|  | | | | |
| APPswe/PS1A246E | * APP mutation: Swedish * PSEN1 mutation: A246E | * Memory deficits (3 m) * Plaques (6-9 m) * Neuronal loss (10 m) | * Altered NREM duration (5 m) | (Casas et al., 2004; Dewachter et al., 2000; Filali and Lalonde, 2015; Jyoti et al., 2010; Liu et al., 2002) |
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| **APP. PSEN AND TAU TRANSGENIC MOUSE MODELS OF AD** | | | | |
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| 3xTgAD | * APP mutation: Swedish * PSEN1 mutation: M146V * Tau mutation: MAPT P301L | * Intracellular A (2 m) * Gliosis (2 m) * Tau pathology (2 m) * Memory deficits (4 m) * Plaques (6 m) * Reduced long-term potentiation (6 m) | * No changes to sleep duration (18 m) | (Billings et al., 2005; Kent et al., 2018; Mastrangelo and Bowers, 2008; Oddo et al., 2003) |
|  | | | | |
| PLB1 | * APP mutation: Swedish, London * PSEN1 mutation: A246E * Tau mutation: MAPT P301L, R406W | * Memory deficits (4 m) * Tau pathology (6 m) * Reduced long-term potentiation (6 m) * Few plaques (6-13 m) * Synaptic dysfunction (12 m) | * Altered power spectra (5 m) * Altered NREM duration (5 m) * Altered REM duration (13 m) | (Jyoti et al., 2015; Koss et al., 2013; Platt et al., 2011; Ryan et al., 2013) |
|  | | | | |
| **OTHER MOUSE MODELS OF AD** | | | | |
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| APPSwDI/NOS2 -/- (CVN-AD) | * APP mutations: Swedish, Iowa, E693Q | * Plaques (3 m) * Neuronal loss (5.5-12 m) * Gliosis (8-9 m) * Memory deficits (12 m) * Tau pathology (12 m) | * Somewhat altered NREM duration (8-9 m) * Altered total sleep count (8-9 m) | (Nwafor et al., 2021; Turner, 2021; Wilcock et al., 2008) |
|  | | | | |
| P301S Tau | * Tau mutation: MAPT P301S | * Gliosis (3 m) * Tau pathology (4 m) * Tangles (5 m) * Synaptic loss (6 m) * Reduced long-term potentiation (6 m) * Memory impairment (6 m) * Neuronal loss (8 m) | * Altered power spectra (6 m) * Altered REM duration (9 m) * Altered NREM duration (11 m) * Altered NREM count (9 m) * Altered REM count (9 m) * Altered NREM length (9 m) * Altered REM length (11 m) | (Holth et al., 2017; Takeuchi et al., 2011; Yoshiyama et al., 2007) |
|  | | | | |
| rTg4510 | * Tau mutation: MAPT P301L | * Tau pathology (2-2.5 m) * Memory impairment (2-2.5 m) * Gliosis (2.5 m) * Reduced long-term potentiation (4.5 m) * Neuronal loss (5.5-8.5 m) * Synaptic loss (7.5 m) | * Altered power spectra (4.5 m) * Altered REM length (5.5 m) * Altered REM count (5.5 m) * Altered NREM duration (6.5 m) | (Helboe et al., 2017; Holton et al., 2020; Hoover et al., 2010; Kopeikina et al., 2013; Ramsden et al., 2005; Santacruz et al., 2005; Wes et al., 2014) |
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| SAMP8 | * Spontaneous | * Gliosis (1-2 m) * Memory impairment (2 m) * Neuronal loss (2 m) * Plaques (6 m) * Reduced long-term potentiation (12 m) | * Altered NREM duration (4 m) * Altered REM duration (4 m) | (Armbrecht et al., 2014; Beuckmann et al., 2021; Del Valle et al., 2010; Kawamata et al., 1997; Miyamoto et al., 1986) |

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