**Figure 1 – Source Data 3:** Reactions and rates constant involved in core ERK signaling pathway

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reaction equation | Kf (nM-1 Sec-1) | Kb (Sec-1) | Kcat (Sec-1) | Reference  |
| *Rap1GTP + B-Raf* $\leftrightarrow $ *B-Raf\_Rap1GTP* | 6.00E-02 | 1.00E+00 |  | Jain and Bhalla, 2014; Sasagawa et al., 2005 |
| *Rap1GTP + Raf-1* $\leftrightarrow $ *RapGTP\_Raf-1 + RasGTP*  | 6.00E-03 | 5.00E-01 |  | Jain and Bhalla, 2014; Sasagawa et al., 2005 |
| *B-Raf\_Rap1GTP + MEK* $\leftrightarrow $ *pMEK + B-Raf\_Rap1GTP* | 9.38E-03 | 1.20E+00 | 3.00E-01 | ain and Bhalla, 2014; Sasagawa et al., 2005 |
| *B-Raf\_Rap1GTP + pMEK* $\leftrightarrow $ *ppMEK + B-Raf\_Rap1GTP* | 9.38E-03 | 1.20E+00 | 3.00E-01 | Jain and Bhalla, 2014; Sasagawa et al., 2005 |
| *RasGTP + Raf1* $\leftrightarrow $ *Raf1\_ RasGTP* | 6.00E-02 | 1.00E+00 |  | Block et al., 1996; Force et al., 1994; Jain and Bhalla, 2014 |
| *2Raf1\_ RasGTP* $\leftrightarrow $*dRaf1\_ RasGTP* | 1.00E-02 | 5.00E-01 |  | Estimated |
| *RasGTP + bRaf* $\leftrightarrow $ *bRaf\_RasGTP* | 6.00E-03 | 5.00E-01 |  | Jain and Bhalla, 2014; Yamamori et al., 1995 |
| *dRaf1\_RasGTP + MEK* $\leftrightarrow $ *pMEK + dRaf1\_RasGTP* | 1.89E-02 | 2.40E+00 | 6.00E-01 | Estimated |
| *dRaf1\_RasGTP + pMEK* $\leftrightarrow $ *ppMEK + dRaf1\_RasGTP* | 1.89E-02 | 2.40E+00 | 6.00E-01 | Estimated |
| *B-Raf \_RasGTP + MEK* $\leftrightarrow $ *pMEK + B-Raf \_RasGTP* | 6.29E-03 | 8.00E-01 | 2.00E-01 | Jain and Bhalla, 2014; VanScyoc et al., 2008 |
| *B-Raf \_RasGTP + pMEK* $\leftrightarrow $ *ppMEK + B-Raf \_RasGTP* | 6.29E-03 | 8.00E-01 | 2.00E-01 | Jain and Bhalla, 2014; VanScyoc et al., 2008 |
| *ppMEK + PP2A* $\leftrightarrow $ *pMEK + PP2A* | 1.92E-03 | 2.40E+01 | 6.00E+00 | Jain and Bhalla, 2014; Takai and Mieskes, 1991 |
| *ppMEK + PP2A* $\leftrightarrow $ *MEK + PP2A* | 1.92E-03 | 2.40E+01 | 6.00E+00 | Jain and Bhalla, 2014; Takai and Mieskes, 1991 |
| *ppMEK + ERK* $\leftrightarrow $ *pERK + ppMEK* | 3.24E-02 | 1.20E+00 | 3.00E-01 | Haystead et al., 1992; Jain and Bhalla, 2014 |
| *ppMEK + ERK* $\leftrightarrow $ *ppERK + ppMEK* | 3.24E-02 | 1.20E+00 | 3.00E-01 | Haystead et al., 1992; Jain and Bhalla, 2014 |
| *ppERK + MKP-1* $\leftrightarrow $ *pERK+ MKP-1* | 1.50E-01 | 1.60E+01 | 4.00E+00 | Jain and Bhalla, 2014 |
| *pERK + MKP-1* $\leftrightarrow $ *ERK+ MKP-1* | 1.50E-01 | 1.60E+01 | 4.00E+00 | Jain and Bhalla, 2014 |

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